How to Control Cherry Scald in 1968 2831

Robert T. Whittenberger
Eastern Utilization Research and Development Division
U. S. Dept. of Agriculture, Philadelphia, Pa. 19118

For more than a decade we have known that cherry scald depends mainly on three factors: (1) amount of bruising, (2) temperature of cherry, and (3) length of delay between harvest and processing. Yet scald persists today. Why? Is it too costly to apply this knowledge to commercial practice, or have we failed to communicate the knowledge?

Scald and Cherry Shrinkage

Perhaps today I can point out an added incentive for the control of scald. When we control scald we also control cherry shrinkage. Shrinkage is meaningful to both grower and processor because it represents a loss in weight of a valuable product, and therefore a loss of money. We can attack shrinkage best by attacking the number one factor, namely, bruising.

Growers Hidden Loss

Most growers do not know exactly why we in research strive always for bruise-proof harvesting equipment and methods. Even when his cherries are badly damaged, the grower may find no scald, and may receive a high raw product grade score at the cannery. However, events that take place silently in his orchard tank may cost the grower money. Bruised cherries lose weight when held in water. The amounts of sugar, acid, and flavor that leach from the cherry are almost directly proportional to the amount of bruising. Severely damaged cherries may shrink as much as 3 or 4% during an 8-hour holding period prior to weighing in at a cannery (see Table 1). In contrast, unbruised cherries gain weight. We estimate that shrinkage induced by bruising cost some Michigan growers more than $1000 in 1967.

TABLE 1. DOES HARVEST BRUISE HURT THE GROWER? EFFECT OF BRUISE LEVEL ON THE WEIGHT OF CHERRIES PRIOR TO DELIVERY TO PROCESSOR

Grower	Bruised Cherries After Mech. Harvest	Change in Weight of Cherries held in Orchard Tanks	Estim. Dollar Value of Weight Change for 100 ton Grower
A	4%	+0.4%	+$ 145
B	7	0	0
C	18	-1.9	-$ 685
D	32	-3.7	-$1,330
Ave. mech. harvest, 1967		-1.6	-$ 575
Ave. hand picked, 1967		-1.0	-$ 360

Effect of Operator

One factor of great importance in controlling harvest bruising is the machine operator. Operators differ widely in skill, judgment, and dependability. A good operator can spare damage to both fruit and machine, and still maintain production. In 1967 we had an opportunity to study different operators using similar equipment under similar conditions. Our observations are shown in Table 2. One operator bruised only 8% of the cherries, but a different operator bruised 32% of them. A grower should select and train his operators with great care.

TABLE 2. OPERATOR EFFECT: VARIATIONS IN BRUISE LEVEL WITH SIMILAR HARVESTING EQUIPMENT BUT DIFFERENT OPERATORS IN 1967

Operator (mech. harv.)	Bruised Cherries at Harvest Time	Scalded Cherries at Processing Time
A	8%	1%
B	16	4
C (ave.)	21	29
D	24	32
E	32	55

Into the Cannery

Cherries bruised moderately during mechanical harvest and cooled to 60°F. or below within 15 minutes will not scald in 24 hours, provided they are not disturbed again. But in commercial practice they are disturbed again. Within a few hours after harvest they are transported to a cannery where, during unloading and weighing operations, they receive bruise damage that usually is equivalent to the harvest bruise. This cannery bruise is one too many for the tender cherries. In the soak tanks they quickly develop scald and lose weight. During processing they are difficult to handle and give low pack-out yields (see Table 3).

TABLE 3. HOW MUCH BEATING WILL TART CHERRIES TAKE?

Cherries	Source of Bruise	Scald (24 hrs., 50°F.)	Pack-out yield
1	Control, not bruised	0%	88.7%
2	Harvest bruise only	0	85.6
3	Harvest bruise, plus cannery bruise	34	80.2

Processors' Loss

In Table 3 we see that a moderate harvest bruise alone produced no scald, but that a combination of harvest and cannery bruises produced 34% of scald. At the same time the cannery bruise caused a drop of 5.4% in pack-out yield. We estimate that in Michigan in 1967 the cannery bruise cost some large volume processors about $100,000 through reduced pack-out yields. For control of scald and pack-out yield, we should give as much attention to bruise reduction as we now do to control of water temperature.

Sharing the Blame

It is difficult to convince processors that they should share with growers the blame for high scald counts. Yet we are mindful that the recent mechanization in the orchard is accompanied also by recent mechanization in the cannery. New ways of dumping, weighing, destemming, and sorting have been devised. In many cases this means bruising where bruising did not exist before. Packing plants for fresh market apples have designed bruise-proof equipment and methods. Should not tart cherry packers do likewise?

Tests by Processors

We suggest that cherry processors evaluate the effect of their own unloading and weighing procedures on cherry quality. This can be done by carefully taking samples from the grower's truck before unloading, and from the cannery soak tank after unloading. All samples should then be soaked at the same temperature, and scald counts should be made during the normal 8- to 10-hour soak period. The data will serve as a useful guide.

New Handling Method

LaBelle has recently outlined a new and practical method of handling cherries (see Farm Research 31: 1, 10 (1965)). In this method, freshly harvested cherries are cooled and held in their original orchard tanks until time for processing. Cannery soak tanks are by-passed as the soaked and firmed cherries are fed directly onto the processing line. We believe that this procedure will significantly reduce scald and increase pack-out yield.

Aeration and Scald

Prior to the 1967 season there was hope that aeration of cherry soak tank water would provide a new tool for arresting scald. Unfortunately, our 1967 tests were negative (see Table 4). We found no benefit from aeration either in the orchard or in the cannery. Aerated samples were darker and less uniform in color than were the controls.

TABLE 4. SCALD VS. TEMPERATURE, DELAY, AERATION

Soak Temp. (1967)	Scald, %			
	6 hrs.		24 hrs.	
	Aerated			
	No	Yes	No	Yes
38°F.	8	8	28	32
50	9	8	35	46
77	50	40	95	85

Conclusion

Control of scald requires the cooperation of grower and processor. The harvest bruise lights a fuse, and the cannery bruise completes the release of scald-inducing forces. Although cold water handling may halt scald in once-bruised cherries, it is ineffective with twice-bruised fruit.

Cooling and retaining cherries in their original orchard tank until time of processing can be expected to reduce scald counts. The same factors that control scald also control cherry shrinkage and pack-out yield. In 1967, excessive bruising caused substantial dollar losses to both growers and processors through cherry shrinkage and reduced pack-out yields.