

# 1949 Results of Ventilated Storage of Sugar Beets

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Experiments to determine the effect of blowing cold night air into beet storage piles have been carried on at Rocky Ford, Colorado, and Clarksburg, California, for four consecutive years. The results for 1946 and 1947 have already been reported (1) (2)<sup>2</sup>. Additional experiences with this type of ventilation are herewith reported.

## Experimental Procedure

The fans used in the 1948 and 1949 experiments at Rocky Ford were Navy type A-10 exhaust fans with a capacity of 10,000 cubic feet per minute. The vents used were made of 18-gauge steel 55-gallon barrels with the ends cut out, and spaced two inches apart to allow for escape of air inside the pile. These vents ran crosswise of the piles and were spaced 20 feet apart.

Table 1.—Shrinkage in Weight and the amount of sugar loss in Ventilated and Non-ventilated Beet Storage Piles at Rocky Ford, Colorado, in 1948 and 1949.

	Ventilated Pile		Non-Ventilated Pile	
	1948	1949	1948	1949
Percent loss in wt.	3.8	6.10	7.01	7.50
Loss in lbs. of sugar per ton per day	0.34	0.43	0.78	0.51
No. of days storage	40	38	40	38

The samples for immediate sucrose analysis and for placement in the piles were selected as described in earlier experiments (1). The same procedure to obtain pile temperatures was used, namely; hanging stem thermometers inside 1/2 inch pipes which had been driven into the beet piles.

## Temperatures

The effect of blowing cold night air into the beet piles at Rocky Ford was much the same as was experienced in the 1946 and 1947 experiments. In the ventilated piles, there was a rapid drop from initial temperatures of between 55 to 60° F. down to 40° F. or lower after five nights of fan operation. The average temperature of the non-ventilated pile in 1948 did not reach 40° F. until 24 days after piling while the temperature of the non-ventilated pile in 1949 was still 44.5° F. after 38 days of storage.

## Sugar Losses and Weight Shrinkage

Table 1 presents the data based on the weights and sugar content of the samples which were placed in the piles.

It may be noted from the data in Table 1 that the shrinkage in weight was greatest in the non-ventilated piles and that the loss in sugar per ton per day of storage was also greater in the non-ventilated pile.

The results for the experiments at Clarksburg are presented in **Table 2**.

<sup>1</sup> Plant Pathologist and Factory Managers, American Crystal Sugar Company.

<sup>2</sup> The numbers in parentheses refer to literature cited.

Results presented in Table 2 show a substantial reduction *in* sugar losses where ventilation with cool night air is employed. It may be noted that the losses in the Clarksburg experiments are considerably higher than those obtained at Rocky Ford. This is no doubt the results of higher day and night temperatures during the beet storage period.

### Discussion

Experiences in the ventilation of sugar beet storage piles at Rocky Ford and Clarksburg as well as at other locations in American Crystal territory have been favorable to the extent that in 1949 a total of 140,019 tons were handled in this manner.

**Table 2.**—Effect of blowing cool night air into Sugar Beet Storage piles on Sugar losses at Clarksburg, California in 1948 and 1949.

	Ventilated Pile		Non-Ventilated Pile	
	1948	1949	1948	1949
Loss in lbs. of sugar per ton per day	0.75	1.15	1.12	1.55
No. of days storage	50.1	27.0	25.3	32.1

If beets are delivered promptly from the field, and are reasonably free of trash, little difficulty is experienced in storage if they are ventilated. The length of the storage period may have to vary with the prevailing climatological conditions at a particular locality. The maximum storage period for the Clarksburg area seems to be about 50 days for ventilated beets and less than half as long for non-ventilated beets. Ventilated storage piles can be kept for much longer periods at Rocky Ford, Colorado; Mason City, Iowa, and Chaska, Minnesota.

The critical period at all locations is usually the forepart of the storage season. At this time air temperatures are highest and it is necessary that the temperature of the early storage beet piles be reduced below 50° F. as soon as possible. If this can be accomplished in the first week of storage then a minimum of ventilation is required to keep pile temperatures at a low level.

### Summary

Ventilation of sugar beet storage piles has resulted in lowering of temperatures and a subsequent reduction in sugar losses over a period of four years.

*Two of the important factors in the conservation of sugar in the pile are the following: Beets should go into the pile fresh and free from trash, and pile temperatures should be lowered as soon as possible.*

On the basis of past results, a total of 140,019 tons sugar beets were ventilated at six factories of the American Crystal Sugar Company.

### Literature Cited

1. DOWNIE, A. D. Sugar Beet Storage Experiment, 1947. Proc. Am. Soc. Sug. Beet Tech., pp. 660-664. 1948.
2. HOLMES, L. J. 1947 Results of Beet Storage Pile Ventilation. Proc. Am. Soc. Sug. Beet Tech., pp 669-672. 1948.