

Moisture Content and Germination of Sugar Beet Seed

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The 1948 beet seed crop in the Fraser Delta of British Columbia was harvested under abnormally wet conditions. Occasional light showers delayed the swathing somewhat, but the combining was stopped completely for 10 days by several heavy rains. In some cases the underside of the swath failed to dry out completely before combining was necessary. Consequently, the average moisture content in some of the freshly combined seed was very high. This very wet seed was dried in the country within a few hours after combining, to reduce the moisture to between 15 and 17 per cent. It was then shipped to the cleaning plant and redried either before or after cleaning to about 12 per cent or less.

The equipment used to dry the crops both in the field and at the factory was a portable "American All-Crop Dryer." This unit consisted of two 3- or 5-gallon oil burners and a propeller-type fan driven by a 5 HP motor and capable of delivering 20,00 C.F.M. at 1/2 S.P. The hot air from the fan entered the drier box through a 36-inch diameter canvas duct. The drier box was mounted on a standard four-wheel farm wagon.

The outside dimensions of the drier box were 17x8x4 feet. The beet seed in 100-pound jute sacks was laid in two layers on a heavy screen supported about one foot above the bottom of the box. The bottom layer of sacks were laid on their sides in one direction with narrow spaces between the sacks to permit hot air to strike the second layer which was laid tightly packed in the opposite direction. The temperature of the air on entering the seed was 100° F., but a great deal of this heat was extracted by the damp seed. This type of drier was found to be very economical of fuel, since the drying is accomplished with a small amount of heat and a large amount of air. Only one 3-gallon burner was used to maintain the desired air temperature, but if more rapid drying were necessary it might be possible to use somewhat higher drying temperatures without damage to germination. Accurate information on the upper temperature limit of safe drying of beet seed was not available. The drying box had a capacity of 2 tons and the moisture content was reduced by about 2 per cent per hour.

One-pound samples of the undried and dried seed from the final drying at the cleaning plant were sealed in cans and stored for 13 months at room temperature. They were then retested for moisture content and germinability and the results are shown in Table 1. All of the analyses were done at the Plant Products Laboratories of the Dominion Department of Agriculture in Vancouver, which have co-operated generously in these tests.

Where the seed had been dried to an average moisture content of 10.7 per cent, the germinability improved slightly during the storage period from 79.9 to 83.3 per cent. The undried seed with a moisture content of 14.9 per cent deteriorated badly in storage and germinated only 50.9 per cent when retested.

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The relation of moisture content to germination after 13 months storage is illustrated in Fig. 1, which shows that the viability of the seed declines sharply in storage at moisture contents above 12-13 per cent.

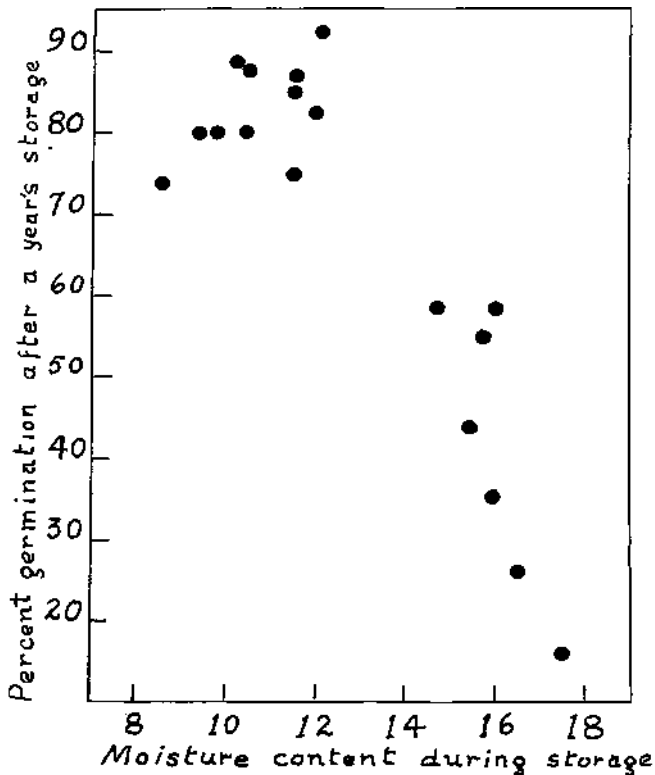


Figure 1.

In actual practice, the sugar beet seed is shipped to the prairies as soon as possible after harvest and if it contains excess moisture will usually dry out gradually in transit and storage. In spite of this, we believe that seed should not be shipped or stored with the moisture content in excess of 13 per cent.

Table 1—The Effect of Drying on Germination

Grower	Percent Germination of fresh seed	Tests run after 18 months storage					
		Undried		Dried		Difference	
		% moisture	% germ.	% moisture	% germ.	% moisture	% germ.
Ellis	78	16.3	26	9.9	80	-6.4	+ 54
Freisen	75	14.8	59	11.6	85	-3.2	+ 26
Guichon	86	10.2	89	9.4	80	-0.8	-09
Honeyman	91	15.8	55	12.2	93	-3.6	+38
MrCubbin	78	16.0	58	11.6	87	-4.4	+ 29
Neilson	75	16.0	36	10.6	88	-4.5	+ 52
Reifel	80	15.7	44	10.5	80	-5.2	+ 36
Savage	81	17.4	16	8.7	74	-8.7	+ 58
Trim	75	11.5	75	12.0	83	+ 0.5	+ 08
Averages	79.9	14.9	50.9	10.7	83.3	-4.2	+ 32.4