A NEW DECORTICATING MACHINE FOR SUGAR BEET SEED

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There have been in California during the last two or three years numerous examples of poor and uneven stands secured from planting our regular sheared seed. Some of this trouble has no doubt been the result of improper or faulty seeder operation, limited soil moisture and low seeding rates. While everyone concerned with this problem has recognized the advantages in labor savings and seedling vigor they have decided that the hazard of securing unsatisfactory stands was not in all cases worth the risk of necessary abandonment. During 1945 and to a greater extent in 1946, we found many growers insisting on whole seed in preference to sheared seed.

The work being done by Professor Roy Bainer at the University of California at Davis on a new and better seed processing system was certainly performed at a very opportune time as far as this problem was concerned. The principal and resulting product of his method of seed decorticating appeared to provide practically all of the advantages of sheared seed and to eliminate almost all of the disadvantages. The progress report and field planting information available early in 1946 was so encouraging as to the possibilities of correcting the problems our beet growers had been experiencing that the Holly Sugar Corporation decided to construct a practical test model of a seed-processing unit according to the general specifications recommended by Professor Bainer.

Early last summer the writer contacted the Blackwelder Manufacturing Company at Rio Vista, manufacturers of the Harbeet harvester, to enlist the aid of their engineering and construction facilities to build such a machine. Following a series of conferences with Professor Bainer we decided on the general specifications of a machine to operate continuously and to perform the work of both the steel burr plate and the rubber-faced plate used alternately in the original experimental machine at Davis.

This decorticating machine consists essentially of 2 vertical shafts mounted in a rigid angle iron framework and driven by V-belts from a 5 h.p., 1150 rpm motor mounted vertically within the framework. On the upper end of 1 shaft is mounted a 10" diameter grinding wheel running at about 750 rpm and mounted above this wheel on an adjustable mounting plate is a steel burr plate from a Letz feed grinder. Seed is introduced into this wheel through a small funnel mounted in the center of the upper plate and the resulting seed is collected through a funnel mounted around the grinding wheel and fed by gravity into a similar hopper through the center of a rubber-faced plate and a grinding wheel 20" in diameter which runs at a speed of about 435 rpm. The discharge from this wheel is then delivered directly to an air-lift elevator and our system of Clipper cleaners to screen and fan the processed seed to the desired standards. This seed is then run over a gravity table cleaner and separated according to preferred specifications.

The burr plate and rubber plate are set with clearances of from .125" to .150" from the grinding wheels. This setting has to be determined by the size of the seed introduced and the desired size of the resulting product. Considering the damage to the steel and rubber plates and to the grinding wheel which

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might occur if any foreign material such as rocks or scrap iron should be introduced, we have arranged our setup to have the sack-run whole seed fed into the machine through an air-lift elevator.

In experimental runs with this machine we have found the capacity to vary from 400 to nearly 800 lbs. per hour of whole seed depending upon the size and condition of the seed and the clearances of the plates.

Following are some brief results of our test runs as to recovery and germination. We have cooperated in most of these runs with Professor Bainer and he has made more comprehensive analyses of the results in the University laboratory.

Introduced Weight	Type	Recovered Weight	Screen Size Range	%
8221	Normal	4808	7/64 to 9/64 in.	58.48
7600	Graded 12/64	4857	7/64 to 9/64 in.	63.90
1500	Normal	974	7/64 to 10/64 in.	64.93
300	Graded 12/64	245	7/64 to 10/64 in.	81.76
17621		10884	Average	61.76%

By comparison our standard shearing process during the same period resulted in the following recoveries:

4410	33 Std.	2500	7/64 to 9/64 in.	56.6
4200	22 Std.	2000	7/64 to 9/64 in.	47.6
10752	US 15	5000	7/64 to 9/64 in.	46.5
19362		9500	Average	49.06

Ransom Laboratory germination results:

Regular Sheared 7/64 to 9/64 in. size

Type	Variety	Normal	Germination	Singles	Doubles
SR	U.S. 15	83.5%	80.25%	68%	16%
SR	U.S. 15	83.5%	78.50%	32%	47%

Decorticated 7/64 to 9/64 in. size

SR	U.S. 15	92.5%	88.5%	63%	25%
SR	U.S. 15	92.0%	88.0%	61%	27%
Graded 12/64	U.S. 33	91.25%	92.25%	29%	64.5%

We are planting limited amounts of this decorticated seed in all of our California districts on an experimental basis in comparison with sheared seed and whole seed. From these plantings we hope to have information to help us in the final consideration of our policy regarding seed processing.

Considering the work of Professor Bainer in developing this process we have decided, for our own records, to refer to this machine as the "Davis Decorticator" and we feel sure that it represents a distinct step forward in the whole program of improved beet seed processing.