

ALBERTA AGRICULTURAL RESEARCH INSTITUTE

ON-FARM DEMONSTRATION

FINAL REPORT
PROJECT NUMBER: 92-F005-1

**The Use of Single-Drop Russet Burbank
Potato Seed Planted at Two In-Row
Spacings**



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Abstract

Mike Wind, a potato grower from Taber, planted approximately 14 acres of Russet Burbank potatoes in the center of a pivot circle of potatoes using single-drop (whole) seed tubers weighing 2 to 3 ounces. The whole pieces were planted at 12-inch and 14-inch in-row spacings. The remainder of the field was planted at 12-inch in-row spacing using seed pieces cut from seed tubers greater than 6 ounces.

Stem numbers per plant were high in both the whole and cut-seed areas of the field. There were no differences in stem numbers per plant or percent stand between the whole and cut seed portions of the field. There were no appreciable differences in yield between the single-drop and cut-seed portions of the field. The tubers from the whole-seed portion of the field, planted at 12 inches between plants, were smaller, but more uniform, than the tubers harvested from the cut-seed portion also planted at 12 inches.

The demonstration did not show the same results as plot studies. In this demonstration the plants grown from cut seed had higher stem numbers than normally seen in commercial fields where cut seed is used. Whole seed has been shown to have significantly more stems than cut seed pieces of the same size. The reasons why the plants grown from cut seed in this demonstration had high stem numbers are uncertain. Stem numbers from cut seed are known to increase with the physiological age of seed tubers, size of cut seed pieces, and size of mother tubers before cutting. (The size of the uncut mother seed tubers or cut seed pieces were not measured prior to planting. Relatively small mother seed tubers and large cut seed pieces would result in higher stem numbers.)

This project did demonstrate the work-load and handling advantages of whole seed tubers. The principal co-operator was so impressed with the advantages of handling whole seed that he is planning to plant a half circle or full circle of potatoes using whole seed in 1993, depending on availability of whole seed. Because of this the on-farm demonstration will not be repeated as originally planned.

PURPOSE OF THIS DEMONSTRATION

Seed-piece research in Alberta, Washington state and Ontario has shown the benefits of seed lots that have mother tubers under 10 ounces. Whole, or single-drop seed pieces have been shown to be very productive and require much less work (cutting and handling) at planting time. This project was to demonstrate some of the benefits of whole potato seed.

OBJECTIVES

The objectives as stated in the application form were as follows:

- 1) To have farmers understand the benefits of planting single-drop seed.
- 2) To have farmers understand the improvements in stand and plant uniformity from using single-drop seed.
- 3) To demonstrate the benefits of high populations of uniform vigorous plants.

PROCEDURE

The principal cooperator, Mike Wind, purchased 15 tons of whole Russet Burbank potato seed¹ from Tri-Seeds Ltd. and planted it along with cut seed of comparable quality on April 21, 1992. (Photos 1 to 4.) The whole seed was planted in the middle of a pivot circle and the cut seed on both outside portions. (Figure 1.) The whole seed was planted at 12 and 14 inches in the row², and the cut seed was planted at 12 inches in the row³.

¹ The original project proposal was to plant two varieties, Russet Burbank and Norchip, however a contract to grow Norchip was not available. Therefore only Russet Burbank was used in this demonstration. The principal cooperator purchased single drop seed for less than budgeted for and therefore planted a larger demonstration than planned.

² The original plan was to plant Russet Burbank single-drop seed at 10" and 11" in-row spacings. The contracting processor changed its contract specifications for spacing and therefore the spacings used in the demonstrations were changed from the original proposal.

³ A second treatment was applied to the field which is noted here, but as there was no direct relationship to this demonstration no further references will be made in this report. The east half of the field was treated with VapamTM soil fumigant in the fall of 1991. Some benefits claimed by the manufacturer include improved tuber set where infestations of rhizoctonia fungi may be severe enough to prune small tubers and stolons. In some fields it may even increase stem numbers. The Vapam treatment was likely referred to on the summer tour of demonstrations, thus the reference to that treatment here.

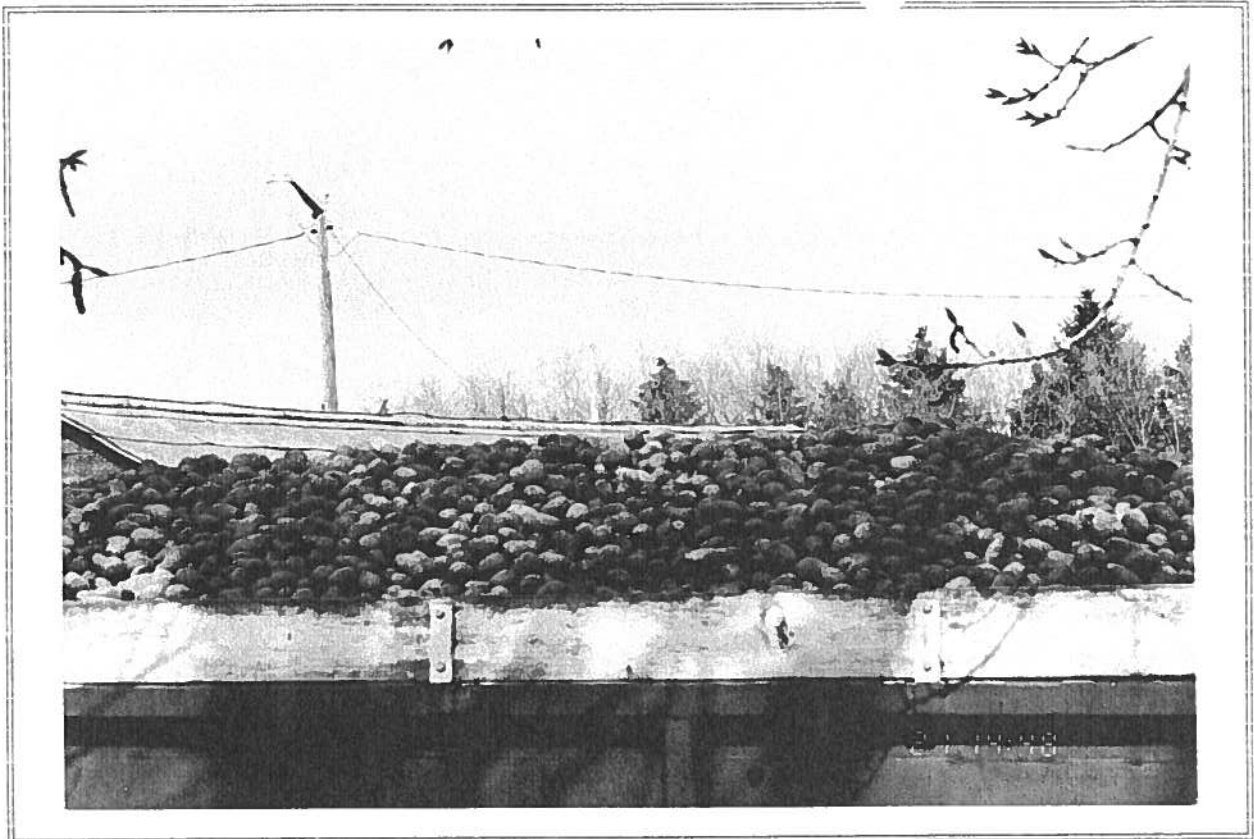


Photo 1. Whole seed on truck ready for loading into planter.



Photo 2. Closeup of whole seed.

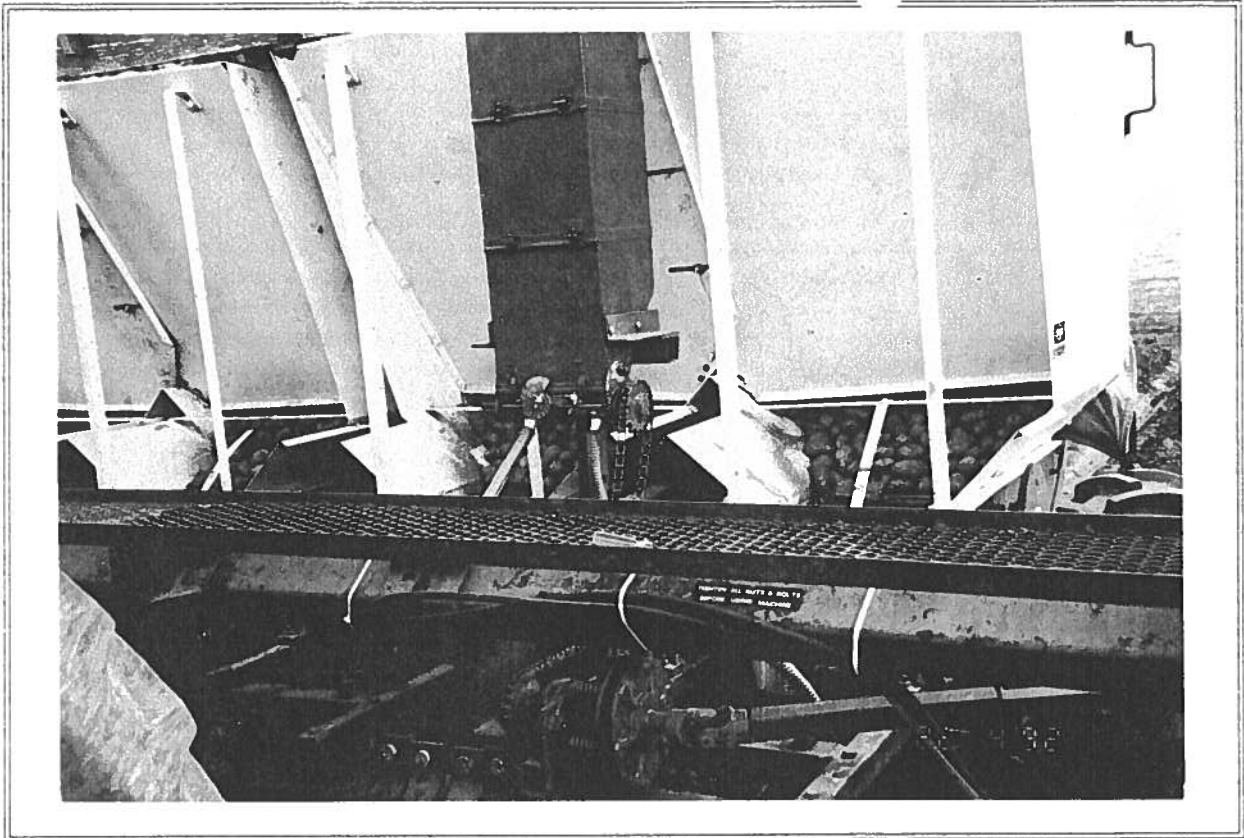


Photo 3. Whole seed in planter.



Photo 4. Mike Wind with exposed planter row showing uniform seed-piece placement.

FARMING FOR THE FUTURE ON-FARM DEMONSTRATION

The Use of Singladerop

Potato Seed

Mike Wind

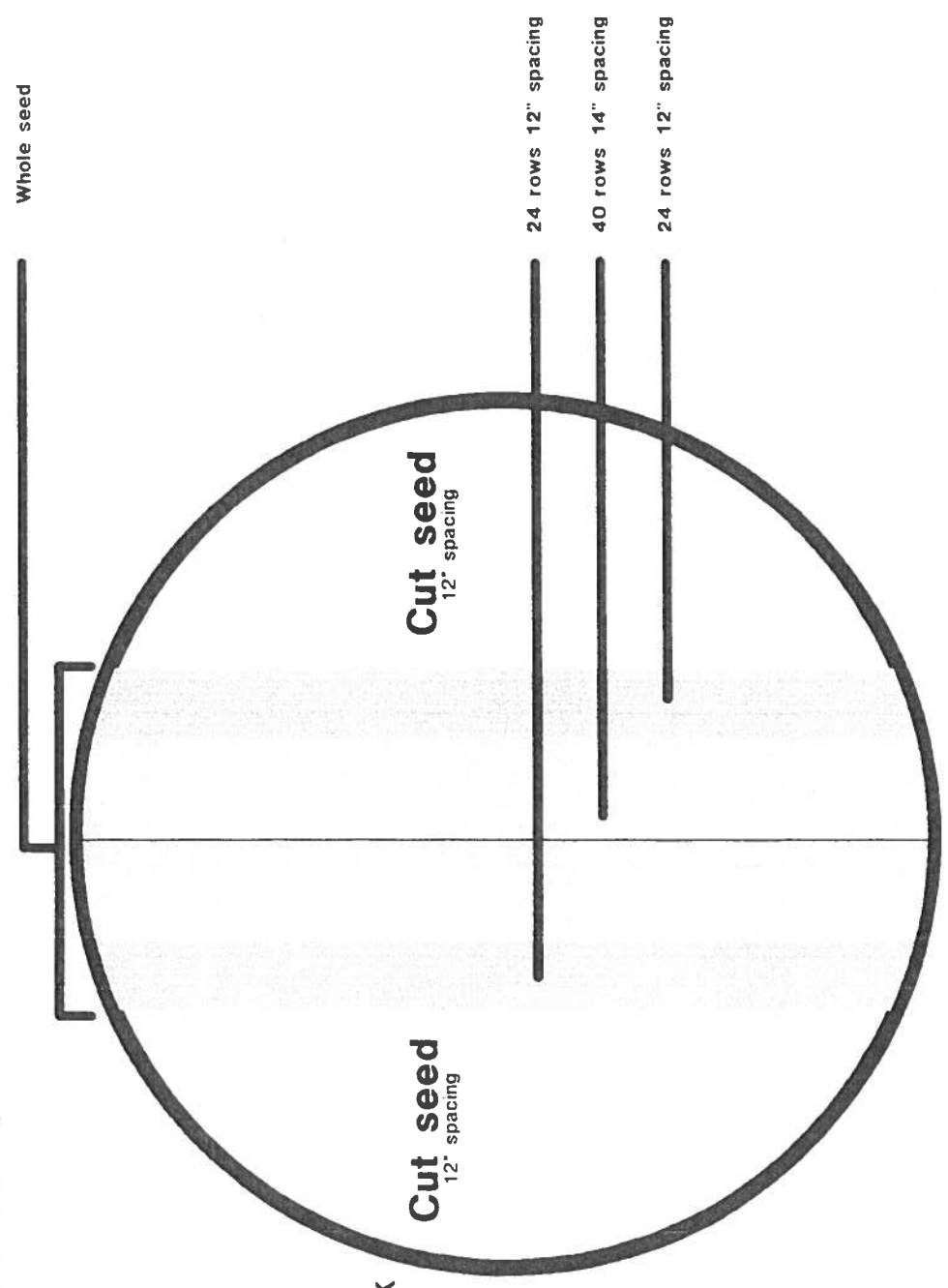
Windiana Farms

Taber, Alberta

Planted: April 22, 1992

Variety: Russet Burbank

Figure 1.



No Vapam side Vapam treated side

Not to scale

Recent studies in Washington State have shown that the process of loading, unloading, cutting, re-loading in a truck and again into the planter cause bruising damage to mother tubers and cut seed pieces. These bruises have been shown to caused seed-piece decay, reduced stand, and reduced plant vigor. Although poor stand and vigor, as a result of excessive handling, were not evident in the parts of the demonstration field planted with cut seed, this is another reason why growers might be interested in using whole seed.

This project did demonstrate the work-load and handling advantages of whole seed tubers. Whole seed is picked up at the seed grower's farm, driven to the field, unloaded into the planter and planted. Normally whole seed does not require seed-piece treatments to prevent seed decay. Seed tubers that require cutting are normally picked up at the seed grower's farm, unloaded in a storage at the commercial farm, picked up with a scoop loader/piler, run through the cutter, loaded back onto a truck and finally unloaded again into the planter. The cutting operation requires several people to man the (\$40,000) cutter. These people are at risk of being exposed to fungicide dust from the seed treater.

The demonstration did not show the same results as plot studies. In this demonstration the plants grown from cut seed had higher stem numbers than normally seen in commercial fields where cut seed is used. Whole seed has been shown to have significantly more stems than cut seed pieces of the same size. The reasons why the plants grown from cut seed had high stem numbers is uncertain, but likely was a result of the uniform size and shape of the tubers in the seed lot that was cut. Stem numbers from cut seed are known to increase with the physiological age of seed tubers, size of cut seed pieces, and size of mother tubers before cutting.

DISCUSSION

Stem populations and stands were recorded on July 7, 1992 from all three portions of the field. (Table 1.) Contrary to research findings there were no differences between the stand and stem number between the whole-seed and cut-seed portions of the field. The stem numbers recorded were high in both the whole and cut-seed portions. They were consistent with stems numbers measured in population studies at Brooks that indicate that between two and three stems per linear foot are required to achieve maximum yields of Russet Burbank potatoes for processing. The crop was harvested on September 20, 1992. No yield data were attempted because there were no apparent differences between the various portions of the field. The yields from all portions of the field were high, and over 20 tons per acre were put into storage from the entire field. The tubers from the whole-seed portion of the field, planted at 12 inches between plants, were smaller, but more uniform, than the tubers harvested from the cut-seed portion also planted at 12 inches.

DATA COLLECTED AND OBSERVATIONS

CONCLUSIONS

The demonstration did not meet the objectives of showing the agronomic benefits of using whole seed. However, in the background statement on page 6 of the application we stated, "Whole or single-drop seed pieces ... require much less work (eg. cutting and handling) at planting time." This was clearly established in the demonstration and the Principal Co-operator, Mike Wind, is planning to expand his use of whole seed. The extent of use will depend on the availability of whole seed.

The last objective in the application stated, "To demonstrate the benefits of high populations of uniform vigorous plants." The entire field in this demonstration had high stem populations. When this was coupled with good mid-season management the result was high yields of top-quality potatoes for processing.

RECOMMENDATIONS FOR FUTURE ACTION

This demonstration will not be repeated because of the impact it had on the principal co-operator. He plans to use whole seed when possible in the future.

Alberta Agriculture staff and other industry staff will continue to stress the importance of plant stand establishment and stem populations on the production of high yields of quality potatoes.

ON FARM DEMONSTRATION USE OF WHOLE POTATO SEED

STEM NUMBERS

		VAPAM				NO VAPAM			
		12"S		12"C		14"S		12"S	
Rep.	# pl stem	# pl stem	# pl stem	# pl stem	# pl stem	# pl stem	# pl stem	# pl stem	# pl stem
Rep. 1	40	117	40	117	39	120	50	173	141
Rep. 2	35	111	47	144	37	112	42	141	142
Rep. 3	39	112	42	122	43	128	49	160	142
Rep. 4	39	115	42	150	46	139	43	142	616
Total	153	455	171	533	174	480	184	616	
STEMS/PLANT		2.97	3.12	3.11	3.14	2.94	3.35		
STEMS/FOOT		2.28	2.67	2.77	2.4	2.56	3.08		

STAND

STAND %	14"S	12"S	12"C	14"S	12"S	12"C
89.3	85.5	89	89.3	87	89.4 percent	92

Notes: S = single-drop seed. C = Cut seed.

Table 1.