

Evaluation of the Spudnik Bed Planter for Chipping Potatoes in Southern Alberta – 2010

Ted Harms and Michele Konschuh

Alberta Agriculture and Rural Development, 301 Horticultural Station Road East, Brooks, AB
T1R 1E6

Background

There have been a number of recent reports identifying the benefit of planting potatoes in wider beds for moisture conservation (Harms and Konschuh, 2010; Steele et al., 2006; Mundy et al., 1999). Moisture conservation is important, primarily when potato production relies on supplemental irrigation to provide sufficient soil water for growth and bulking of the tubers, however, the main interest of producers regarding bed planting of potatoes is for uniform size, regular shape, increased production per unit area and better economic return.

Bed planting of potatoes is fairly new to North America but is widely practiced in Europe as the production method of choice. Plant densities within the beds can be varied depending on the equipment used. Standen-Pearson Corporation out of England sells planters that will seed 3 to 9 rows in a bed with variable seed spacing from 13 cm to 45 cm.

The primary advantages identified, for bed planted potatoes in Europe, are the increase in yield, consistent size, less greening, protection from frost damage and regular shape compared to conventionally spaced and planted potatoes in the standard “hill – furrow” system.

Growers in Idaho have been experimenting with bed planting over the last few years using a planter developed by Spudnik (Baum, 2010). Responding to the interest expressed by a few growers and a processor, Growers Supply secured one of the Spudnik bed planters and brought it in to Canada for a limited trial in 2010.

The purpose of the evaluation was to assess yield, tuber uniformity, water use efficiency and economic returns between bed planted potatoes and conventionally planted potatoes.

The Spudnik Bed Planter

The Spudnik bed planter used was designed to seed 7 rows of potatoes in a 98” bed (Figure 1). The configuration used in 2010 was to block the center row of the seeder and plant 6 rows in a 98” wide bed (Figure 2). With conventional hill seeding, 4 rows would be planted within the same width.



Figure 1. Spudnik bed planter.



Figure 2. Bed planted section of field after emergence. Soil water monitoring site shown in upper, left part of picture

Methods

The Spudnik bed planter was used on a portion of 3 commercial potato fields in southern Alberta in 2010 and at Alberta Agriculture and Rural Development's Irrigation Demonstration Facility in Lethbridge (CACDI). Growers Supply staff assisted with the set up of the bed planter at all sites, Western Tractor supplied a John Deere 8345RT with wide spaced tracks to ensure the power equipment straddled the beds.

Soil water monitoring sites were set up in each field, one in the bed planted area of the field and one in the standard hill/furrow section of the field. Instrumentation at the sites consisted of an access tube to take weekly soil water readings and a collection rain gauge to monitor irrigations and rainfall amounts.

Tuber samples were obtained from three of the sites immediately prior to the main harvest by AARD staff. Four samples (3m) were dug from rows in the conventionally planted area and compared with four samples of 3m x ½ bed section within the bed planted area.

Samples were evaluated for total yield, marketable yield, tuber deformities, specific gravity and internal defects and are presented in ton/acre.

A basic analysis was performed to evaluate the economic benefit or penalty of bed planted potatoes in 2010.

Results

Consistent with previous findings (Harms and Konshuh, 2010), soil water content in the bed planted areas of the field retained about 10% more moisture (week to week) compared to the standard shaped hill.

Different varieties were grown and different plant density strategies were used by growers to test the bed-planting concept. In two of the three fields sampled, yield from the bed-planted area of the field was greater than that from the conventional hill planted area. Both total and marketable yield were significantly greater in Field B. Specific gravity was unaffected by bed-planting in this study (Table 1).

Assuming a basic contract price for marketable potatoes, gross economic returns in the commercial fields were 34% greater from beds than from hills once the seed costs were deducted (Figure 3). To our knowledge, other costs (fertility, pesticides, irrigation, manpower, etc.) incurred were the same for hilled or bed-planted regions of each field.

Table 1. Comparison of yield and size profile and specific gravity of samples from conventional and bed-planted areas of each field.

Field	Treatment	Total Yield (ton/ac)	Yield (ton/ac) Smalls ($<1\frac{7}{8}$ in)	Yield (ton/ac) Marketable ($1\frac{7}{8}$ - $3\frac{1}{2}$ in)	Yield (ton/ac) Large ($>3\frac{1}{2}$ in)	Specific Gravity
A	Hills	28.1a	1.8a	17.8a	8.3	1.084
A	Beds	33.5a	3.1a	23.0a	7.4	1.088
B	Hills	29.8b	5.1b	23.4b	1.2	1.085
B	Beds	42.2a	8.6a	31.5a	1.9	1.086
C	Hills	30.6a	4.0b	26.3a	0.0	1.104
C	Beds	31.7a	5.9a	25.6a	0.2	1.106

Note: Yield comparisons presented were analyzed using the paired t-test between hills and beds for each field independently. For example, Field A was analyzed independent of Field B and Field C.

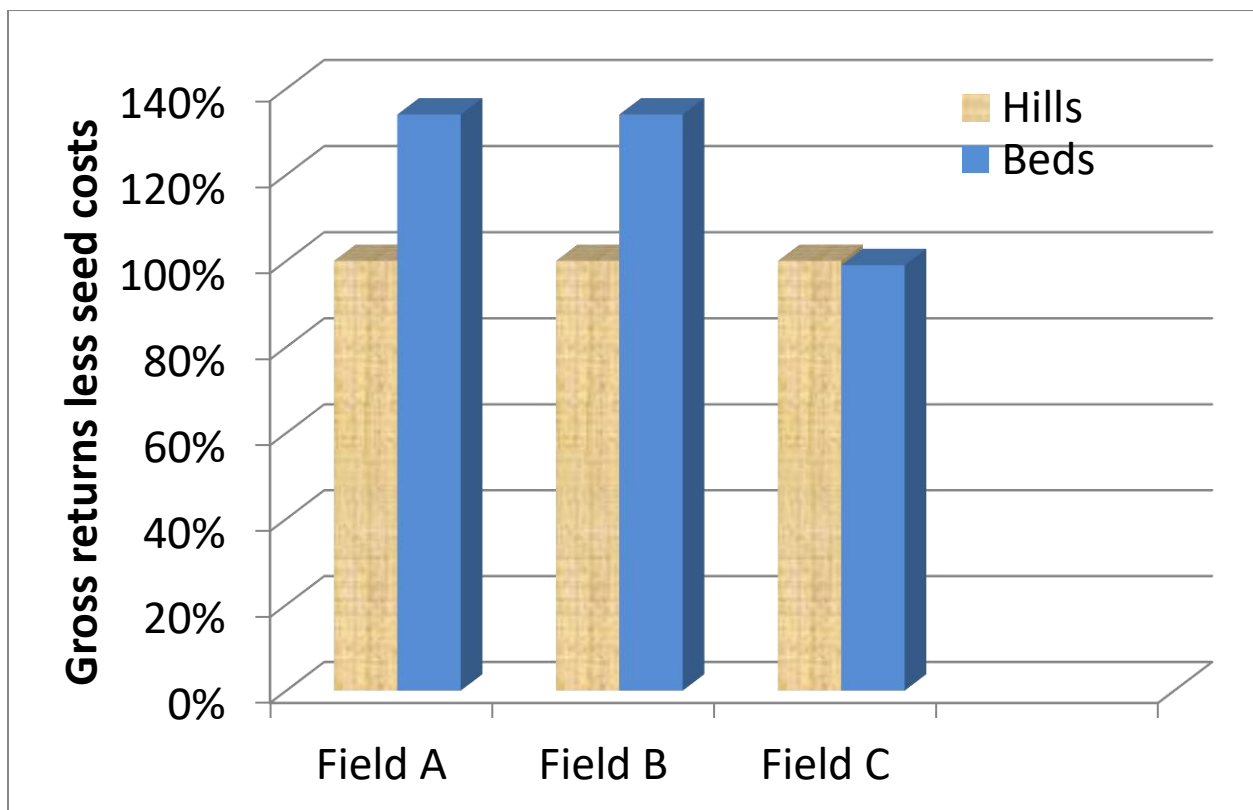


Figure 3. Economic returns from hill planted and bed-planted areas of potato fields as a percentage of conventional hill planted areas. For comparison, a basic contract of \$10/cwt for marketable yield (2 to 3.5") was used. Seed was estimated at \$340/cwt. All other costs were assumed to be equal.

Conclusions

This was a first year evaluation on new equipment. It was identified that it may be necessary to prepare fields differently in fall when using a bed planter compared to fall preparation when using the conventional hill planting equipment. The growers expressed interest in the Spudnik planter but each had suggestions for modifications. As well, there were concerns with the final construction of the bed (relying solely on the drag bar to form the bed).

Planting in a wide bed definitely has a fit for irrigated potato production in southern Alberta. However, to get a complete picture or thorough evaluation of the technique, it would be advantageous to try other bed configurations such as the Quad planted bed (Figure 4) which has 4 off-set rows in a 72" (1.8m) wide bed. The manufacturers of the Quad planter advertise an 82% increase in plant growing area compared to standard hill planted potatoes (Figure 5).

As well, it would be worthwhile to try a selection of the common potato varieties to evaluate the possibilities and/or potential problems with bed planted potatoes.



Figure 4. Four row bed using Standen Quad bed planter.

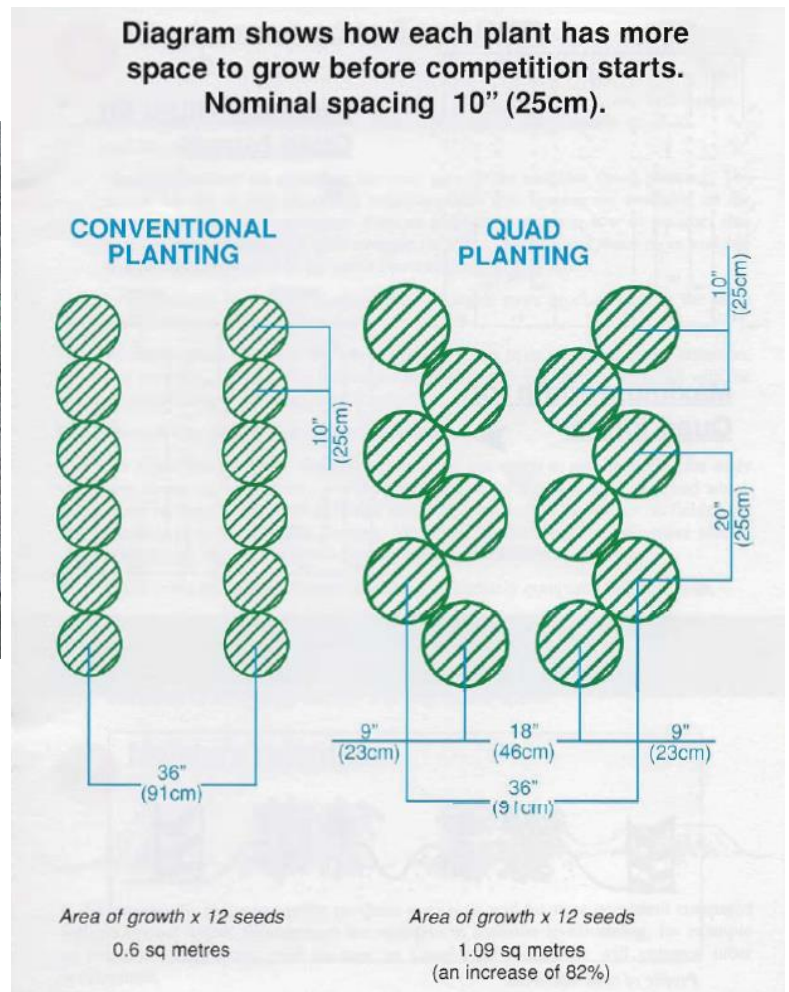


Figure 5. Increases in plant area.

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Contact Information

Michele Korschuh– 403 362-1314

Ted Harms – 403 362-1347