A report to the Oregon Processed vegetable commission
Submitted December 20, 2002

PROJECT TITLE: A COMPARISON OF DIFFERENT ROW AND PLANT SPACINGS IN BED TYPE TABLE BEET PRODUCTION

PROJECT LEADERS: Sam Sweeney, assisted by Tom Sweeney, Country Heritage Farms

OBJECTIVE: To find plant spacings, both in row and row spacing, that would increase yields and percentages of higher grade beets..

BACKGROUND: During the last several years, beet growers have started to switch from a single row production system of planting rows 20" to 24" apart to a bed type system with four rows 12" apart. The beds have a guess row spacing of 24" to 30" which provides room for tractor wheels to cultivate or perform other needed cultural operations. The main reason for this change from single row to bed type production was to take advantage of a multi row harvester that could harvest four rows at once. This change resulted in both higher yields and also significantly increased tonnage output per hour.

However, the bed type system raised additional questions:

- Can we further increase yields by adding additional rows in a bed and space the plants in a uniform spacing and utilize each plants full production potential?
- Would there be a higher percentage of # 1 beets if the plants were in a equal and uniform plant configuration?
- Would the beets reach harvest maturity in a shorter and more predictable time if they were spaced at a further and more uniform distance apart in the rows?
- With a higher plant density, would there be a decrease in weed populations?

There had been two previous research projects by Bill Mansour, OSU Extension, to evaluate the benefits of bed type production and multi row harvesting. The research project in 1998 evaluated the advantages of planting seeds of a single sprout ball count and also to determine if the harvested beets could be processed efficiently and economically in the processing plant.

The second research project was to determine if the variety Red Ace would be a better variety for bed type production and to compare several different planters. Both projects determined that bed type production resulted in increased yields and a higher grade of beets, but adding additional rows and evaluating a Stanhay belt type planter capable of a uniform seed spacing was not considered during these two projects.

It was decided that during 2002 a field type project would try and further answer the previous questions in a on farm study.

GENERAL INFORMATION OF PROJECT

EQUIPMENT: Two Stanhay belt type planters were combined in tandem which allowed seven rows to be spaced 6" apart on a single bed. There were two plant spacing in the rows. One test plot was ¾" apart and the other plot spacing was .94". This was accomplished using a triple row belt with two rows of 60 holes. The control check plots were planted using a tool bar planter with eight John Deere 71 unit flex plate type planters. This planter planted four rows spaced 12" apart on each bed. The seed rate was approximately 20 to 22 seeds per foot.

LOCATION & SOIL TYPE: The plots were within a 37 acre field located in the Willamette River bottoms four miles South of Dayton. The soil type was Chehalis, a silty clay loam overflow series.

PLOT CONFIGURATION: The plots were located in the middle of the field with the check plots on each side.

FERTILIZATION: The plots were integrated into the rest of the field using the same amounts and methods of applying fertilizer.

WEED CONTROL: Crop production chemicals were applied in the same amounts and manner on the plots as the rest of the field. RoNeet was applied at the rate of 3 # ai. per acre preplant and Pyramin was applied at the rate of 2# ai. after planting. Cultivation on the plots was limited to the guess row areas between beds. The rest of the field and control check plots were cultivated an additional time between rows. There was not any hand weeding.

IRRIGATION: Irrigation was by wheel moves and applied based on visual observation of need. After planting, water was applied to keep the surface damp to achieve even germination. When the plants had emerged, irrigation was stopped and did not start again until the plant height had reached approximately 2". During the rest of the season, water was applied on five to seven day intervals depending on need.

HARVEST MACHINERY AND METHODS: A multi row AMAC bed type harvester was provided by Ken VanDyke from Forest Grove. Prior to harvest, the beds were flailed twice to remove leaves and stems from the beets. The first flailing was by a rotary chopper followed by a rubber flail "PARMA" to further remove the tops from the beds. This was followed a day later by the AMAC which lifted the bed and elevated the beets up to a series of chain conveyors that would shake and remove dirt and the smaller beets before moving them into the truck.

PROJECT SUMMARY RESULTS

YIELDS, GRADES, ECONOMIC VALUES: To determine the yields, grades, and economic values, two truck loads were harvested from each plot and delivered to NORPAC for grading. Grading, and using the dollar value assigned by NORPAC for each grade determined the value of the beets per ton. The chart below shows the averages for the plots.

	.75" Plt. Spacing	.94 Plt. spacing	Control plot
Grade			
# 1s	. 28%	. 24%	. 26%
# 2s	. 42%	. 46%	. 32%
# 3s	. 08%	. 07%	. 08%
No Value	. 24%	. 25%	. 35%
Gross tons per acre	33.82	32.31	30.52
Graded tons per acre	25.87	24.39	19.84
Av. Value per graded ton	$ 69.31	$68.25	$69.32
Av. Value per acre	$1,793.04	$1,664.62	$1,375.31

The project indicates that the plot with the .75" spacing had the highest economic value per acre followed by the plot with .94" spacing. The control plot, (four 12" rows) had the lowest value per acre.

However, there were variables that should be taken into consideration in evaluating these results. One was the germination rate within the plots. Due to the inherent cloddy conditions of Chehalis soils, they can be difficult to work into a suitable condition for planting. Within all of the plots there were small areas that the germination was not as good as it could have been.

Another variable is the method of selecting samples for grading at the processing plant in truck load amounts. Even though every effort is made to take an average sample that is representative of the load, it sometimes does not reflect the true quality of the entire load.

GENERAL OBSERVATIONS & COMMENTS

- Planting in close 6" rows with spaced seed drops can be accomplished with good yields and grade.

- Seed rates are a little less using a belt type planter. A plate planter is not as precise in amount of seed planted.

- Observations of weeds within the plots indicate that they are less of a problem in close row spacings. This is due to the leaf canopy closing early over the soil surface. However, any Pigweed or Lambsquarter germinating at the same time as the beet seed would push through the leaf canopy. In a close 6" row spacing, there would be a very narrow time and surface to cultivate. A grower should evaluate each field for suspected large populations of broadleaf weeds. Grassy weeds are rarely a problem with the use of RoNeet.

- Using a Stanhay belt planters for planting close spaced beets can be slow; 2 to 2.5 mph. This is in contrast to the John Deere 71 flex planter that plants at 5+ mph.

One of the project goals was to determine if there would be a shorter time between planting and harvest if the beets were planted 2 to 3"apart. This part of the project was abandoned due to expected conflicting time schedules for the harvester and the processing plant.

SIGNATURE DATE

Signature redacted for privacy.

12-22-02