ONCE-OVER HARVESTING OF 'TENDERCROP' BUSH BEANS

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ABSTRACT

The optimum time for a once-over harvest of ‘Tendercrop’ bush beans was 7 days after the first one-third of the beans were harvestable. Yields of total salable beans were 17 to 30% lower from the optimum once-over harvest treatments than from plots harvested 3 or 4 times.

INTRODUCTION

Modern snap bean cultivars produce most of their yield over a 2 week harvest period. Harvesting is recommended when the pods are young, but nearly full size and the beans are small, about one-fourth developed (Splittsosser, 1984; Ware and McCollum, 1975). It is common for gardeners and small growers to hand harvest beans 3 to 4 times, because frequent harvesting induces plants to produce new pods and, thus, increase yield (Splittsosser, 1984).

Currently, in the U.S. Mainland, all processing snap beans and most fresh market snap beans are mechanically harvested (Zandstra, 1979). Since plants are destroyed in the harvesting process, mechanical harvesting permits only a single harvest. Therefore, timing of harvest is critical for obtaining the highest yield and quality of beans. Present methods for determining the optimum harvest time include: grading by sieve size (Nonnecke, 1989; Mullins, 1987), integrating heat units with available soil moisture (Kish and Ogle, 1980) and counting the days from full bloom (Nonnecke, 1989). However, growers are still looking for a simple method that would help to accurately predict the optimum harvest date.

The objective of this study is to find a simple method to determine the optimum time for a once-over harvest of snap beans and to compare the yields of a once-over harvest with multiple harvests.

MATERIALS AND METHODS

‘Tendercrop’ bush beans (Phaseolus vulgaris L.) were seeded 10 cm apart in rows 0.9 m apart at the University of Hawaii Experiment Station in Hilo on 21 December 1981 and 8 April 1982. In the first trial, one treatment was harvested 4 times (0, 3, 7 and 14 days after first harvest) and once-over harvests were made at 3, 7, 10 and 14 days after first harvest. In the second trial, one treatment was harvested 3 times (0, 7 and 13 days after the first harvest) and once-over harvests were made at 3, 7, 9 and 13 days after first harvest. Pods were graded as grade 1, grade 2 (salable offgrade) and cull.

A preplant banded fertilizer application of 1 kg 16-16-16 per 20 m of row was supplemented by a similar sidedress application 3 weeks after planting. Overhead irrigation was supplied as needed.

RESULTS AND DISCUSSION

In the December seeded trial, beans harvested at 0, 3, 7 and 14 days after first harvest yielded 18, 15, 31 and 36%, respectively, of the total harvest (Table 1). The total salable yields of once-over harvests at 7, 10 and 14 days after first harvest were similar. However, the yield of grade 1 beans was highest at 10 days after first harvest (i.e. 7 days after the first 33% were harvested). Beans which were once-over harvested at 10 days after first harvest yielded 18% less grade 1 and 30% less total salable beans than when 4 harvests were taken. Plants were damaged from strong winds and this coupled with short daylengths during the winter season caused low bean yields in this trial.

In the April seeded trial, beans harvested at 0, 7 and 13 days after first harvest yielded 44, 46 and 10%, respectively, of the total harvest (Table 2). Total salable yields of once-over harvested taken at 3, 7, 9 and 13 days after first harvest were statistically similar. The yield of grade 1 beans was highest when a once-over harvest was made 7 days after first harvest. However, beans from this once-over harvest yielded 24% less grade 1 and 17% less total salable beans than when 3 harvests were taken.
Our trials suggest that a grower make several random test pickings of the earliest maturing beans. When the grower judges that the test pickings constitute about about one-third of the potential yield, he selects the once-over harvesting date to be 7 days later. Experience should improve a grower’s determination of the optimum harvest date. Data suggest that there are several days of leeway in this determination without significantly reducing yields.

A once-over harvest resulted in yield declines of 17 to 30% as compared to harvesting 3 or 4 times. Therefore, growers switching from a multiple harvest system to a once-over system would need to increase their planting by a similar amount to sustain the same yield. However, they would likely find that a once-over system (whether by hand or mechanical) would allow them to increase their planting by much more than this and thus allow increased yields from their labor input.

ACKNOWLEDGEMENT

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LITERATURE CITED


TABLE 1. YIELDS OF ONCE-OVER AND MULTIPLE HARVESTED BUSH BEANS GROWN DURING DECEMBER TO FEBRUARY.1

<table>
<thead>
<tr>
<th>Bean Quality</th>
<th>Three Harvests 0, 3, 7, 14</th>
<th>Once-Over Harvest kg/m of row</th>
<th>lsd 5%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0, 3, 7, 14</td>
<td>3 7 10 14</td>
<td></td>
</tr>
<tr>
<td>Grade 1</td>
<td>0.49</td>
<td>0.16 0.30 0.40 0.13</td>
<td>0.10</td>
</tr>
<tr>
<td>Grade 2</td>
<td>0.36</td>
<td>0.12 0.31 0.19 0.43</td>
<td>0.10</td>
</tr>
<tr>
<td>Grades 1+2</td>
<td>0.852</td>
<td>0.28 0.61 0.59 0.57</td>
<td>0.18</td>
</tr>
<tr>
<td>Cull</td>
<td>0.09</td>
<td>0.00 0.01 0.04 0.27</td>
<td>ns</td>
</tr>
</tbody>
</table>

1Seeded 1981 December 21; First Harvest 1982 February 9; Strong winds damaged plants.
2Totals of 4 harvests completed 0, 3, 7 and 14 days after first harvest.
3Individual harvests produced 18, 15, 31 and 36 %, respectively, of the total marketable yield.

TABLE 2. YIELDS OF ONCE-OVER AND MULTIPLE HARVESTED BUSH BEANS GROWN DURING APRIL TO MAY1.

<table>
<thead>
<tr>
<th>BEAN QUALITY</th>
<th>Three Harvests 0, 7, 9</th>
<th>Once-Over Harvest kg/m of row</th>
<th>lsd 5%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0, 7, 9</td>
<td>3 7 9 13</td>
<td></td>
</tr>
<tr>
<td>Grade 1</td>
<td>1.38</td>
<td>0.86 1.06 0.79 0.73</td>
<td>0.33</td>
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<tr>
<td>Grade 2</td>
<td>0.55</td>
<td>0.86 0.55 0.67 0.85</td>
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<tr>
<td>Grades 1+2</td>
<td>1.952</td>
<td>1.34 1.61 1.46 1.58</td>
<td>0.40</td>
</tr>
<tr>
<td>Cull</td>
<td>0.24</td>
<td>0.15 0.24 0.68 0.39</td>
<td>0.25</td>
</tr>
</tbody>
</table>

1Seeded 1982 April 8; First Harvest 1982 June 1.
2Totals of 3 harvests made 0, 7 and 13 days after first harvest.
3Individual harvests represented 44, 46 and 10%, respectively, of the total marketable yield.