Gallatin (Check). New selections as entered by plant breeders will be added to the observational trial.

Standard report forms have been used for several years. Reports of the 1973 and 1974 trials are available upon request.

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CHEMICAL CONTROL OF SNAP BEAN RUST

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Rust has been a severe problem on fall grown snap beans in Tennessee for the past three years. Several varieties have shown some degree of rust resistance. Most rust resistant varieties do not have outstanding horticultural characteristics.

Fungicide tests for rust control were conducted in 1974 using the cultivar, Early Gallatin. This cultivar has good horticultural characteristics but is highly susceptible to rust. Fungicides applied on a seven day schedule were Bravo, Manzate, Polyram and Sulfur. Treatments were started when the first rust pustules appeared. Polyram and Sulfur provided little rust control. A combination of Bravo (1.5#/A.) and Manzate (2#/A.) provided the most effective rust control, but differences were not significant between the combination, and Manzate and Bravo used separately. Yields from plots treated with Bravo, Manzate, and the Bravo-Manzate combination were not significantly different, but were significantly higher than yields from plots treated with Polyram, Sulfur, and the check plots.

A second test showed that yields were significantly higher (.05 level) when Bravo was used on a seven day schedule compared to Bravo on a 14 day schedule and Manzate on a 7 or 14 day schedule.

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SNAP BEAN SPACING STUDIES

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Snap bean production in the future will probably be with different plant densities and spacings than those now used.

Introductory tests in Tennessee (1) showed that yields per acre from rows 6, 12, and 18 inches apart with 6 plants per foot of row were very similar. Yields from these row spacings were greater than
from 24 inch rows and much greater than from 36 inch rows. These tests led to the suggestion that 18 inch rows with 6 to 8 plants per foot of row were commercially feasible. Several good planters that can plant 18 inch rows are available. Cultivation, which seems a necessity with present herbicides, is possible with 18 inch rows. Varieties tested varied from erect to sprawling. Variety behavior was about the same at all spacings.

Three test plantings made in 1973 and 1974 involved a Winslow-Pacific precision planter to plant varying row spacings and plant spacings within the row. Soil preparation was a major problem associated with the use of this planter. The soil had to be almost level and very loose. Planting speed was 5 MPH which is very desirable. Table 1 shows that results were very favorable when 1 to 2 plants per foot of row were desired. Results were poor when 6 plants per foot of row were desired. Different seed rings were used for each spacing in the row. Rings used for the 6 plants per foot of row were developed for the desired spacing. Reasons for failure at this spacing were not found, but improper seed coverage is suspected as being the primary reason.

Table 1. Spacing, plants per acre and yield per acre of three plantings of Early Gallatin snap beans in 1973 and 1974 at the Plateau Experiment Station, Crossville, Tennessee.

<table>
<thead>
<tr>
<th>Treatment No.</th>
<th>Inches between rows</th>
<th>Desired plants per foot of row</th>
<th>Actual plants per foot of row</th>
<th>Thousand plants per acre (actual)</th>
<th>Yield in tons per acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6</td>
<td>6.0</td>
<td>3.0</td>
<td>218</td>
<td>8.9</td>
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<tr>
<td>2</td>
<td>6</td>
<td>2.0</td>
<td>2.9</td>
<td>206</td>
<td>6.1</td>
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<tr>
<td>3</td>
<td>9</td>
<td>6.0</td>
<td>2.7</td>
<td>132</td>
<td>5.6</td>
</tr>
<tr>
<td>4</td>
<td>9</td>
<td>2.0</td>
<td>1.8</td>
<td>87</td>
<td>4.6</td>
</tr>
<tr>
<td>5</td>
<td>9</td>
<td>1.3</td>
<td>1.4</td>
<td>68</td>
<td>3.0</td>
</tr>
<tr>
<td>6</td>
<td>12</td>
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<td>94</td>
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<tr>
<td>7</td>
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<td>66</td>
<td>3.7</td>
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<tr>
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<td>1.3</td>
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<td>2.7</td>
<td>33</td>
<td>3.2</td>
</tr>
</tbody>
</table>

L.S.D. @ .05 1.9
L.S.D. @ .01 2.5

Yields were higher (Table 1) with rows 6 inches apart and 3 plants per foot of row than at any other spacing. This confirms the hypothesis that spacing and density both influence plant growth and fruiting. Treatment No. 2 or plants in rows 6 inches apart and 2.9 plants per foot of row gave lower yields than treatment No. 1. This was attributed to lack of uniformity in stand. Insect damage and pod rot were encountered in the more dense plantings in one of the tests. Rainfall was heavy for this particular crop. Rust was the only disease encountered. Rust
control with fungicides was not satisfactory with the dense spacings. The humidity relationship probably influenced rust more than any other factor.

These studies indicate that planting design changes offer possibilities for greatly increased snap bean yields per acre. However, planter perfection, more effective herbicides, effective systemic fungicides and insecticides and varieties with improved growth habits are needed to make the 6 by 3 inch design feasible.


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FERTILIZATION OF BUSH BLUE LAKE SNAP BEANS

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Production of Bush Blue Lake (BBL) snap bean cultivars has been a problem in Tennessee. Pod quality has been outstanding, but plants have sprawled and machine harvest has been extremely difficult. Reduced fertilization and infertile sites have long been suggested for BBL varieties.

Experiments were conducted from 1972 through 1974 to evaluate the effect of various nitrogen levels on yield and quality of BBL varieties. Nine plantings of BBL 274 and Niagara 773 cultivars were made in 1972 and 1973. Nitrogen levels were 0, 15, 30, 45, and 60 pounds banded per acre with Ammonium Nitrate as the source. No other fertilizer was added to the soils with medium phosphate and potash levels. Plant height, width and lodging increased as nitrogen levels increased. Yields from both cultivars were increased by nitrogen, but the difference among levels was not significant. Nitrogen composition of petiole tissue increased as nitrogen fertilization rates increased and phosphorus, potassium, magnesium, and calcium composition was influenced little by nitrogen levels. Several pod characteristics studied were influenced little by nitrogen levels.

Experiments conducted in 1974 involved three plantings of BBL 274 using 15 and 60 pounds of nitrogen per acre using Ammonium Nitrate, Calcium Nitrate and Sulfur Coated Urea as nitrogen sources. No differences in yield or pod quality were found from either rates or sources of nitrogen. However, plants lodged more severely at the 60 pound rate.

These tests suggest that 15 pounds of nitrogen banded on BBL 274 and Niagara 773 is sufficient for maximum yields and pod quality of