Table 1. Human taste acceptance of mung bean and 3 and 6 day old soybean sprouts.

<table>
<thead>
<tr>
<th>Sprout</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three-day soybean</td>
<td>3.1a</td>
</tr>
<tr>
<td>Six-day soybean</td>
<td>2.0b</td>
</tr>
<tr>
<td>Five-day mung bean</td>
<td>3.0a</td>
</tr>
</tbody>
</table>

2Mean separation by Duncan’s multiple range test. A score of 5 indicates most preferred and 1 least preferred.

sprouts, with no stachyose or raffinose (Fig. 1A), were better than 3-day-old soybean sprouts in terms of digestibility, while 3-day-old sprouts were more acceptable (Table 1). Three day old soybean sprouts however, contain a minimal amount of stachyose and raffinose and should cause little or no digestive problems. Both mung and soybean sprouts should be cooked 5 min in boiling water (12) to destroy trypsin inhibitors, another antinutritional factor. Although protein content declined during germination, soybean sprouts still contained 40% more protein than mung bean sprouts of the same age.

Literature Cited


Co-cropping Sweet Corn and Soybeans1

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Additional index words. Zea mays, Glycine max, Phaseolus vulgaris, pole bean

Abstract.

Three years of studies with sweet corn (Zea mays L. cv. NK-199) and soybeans (Glycine max (L.) Merr. cv. York) planted together in the same row with several plant populations combinations have shown that acceptable sweet corn yields can be produced in the summer followed by soybean yields of approximately 1400 kg/ha in the fall after the sweet corn harvest. This co-cropping system provides two harvestable crops in one season from a single planting operation.

Intercropping crops may provide increased production or improved cultural conditions for crop establishment. Cereal grains are utilized as a nurse-crop for legume establishment and orchards are often interplanted with other crops prior to fruit production. Corn has been grown with other crops prior to fruit production. Corn has been grown with other crops except for soybeans was optimum for silage yields

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Fig. 1. Soybeans growing in the same row with sweet corn. Photographed 5 weeks after planting.

Soybeans and sweet corn were also planted alone at 9 and 25 cm/plant respectively. In 1974, sweet corn was established alone at 17 cm/plant and in combination with soybeans spaced 7.5 or 15 cm/plant.

The plot sizes on Norfolk loamy sand were 3.66 by 9.14 m in 1972, and 3.66 by 10.97 m in 1973 and 1974. These plots were sprinkler irrigated in 1973 and 1974. The plot size in the nonirrigated 1973 Mattapex silt loam study was 2.74 by 7.62 m. The row spacing was 0.91 m in all plots. Each treatment had 4 replicates.

Planting dates were May 25, 1972, May 10, 1973 on the loamy sand, and June 14, 1973 on the silt loam. Sweet corn harvest dates were August 10, 1972, July 26, 1973 on the loamy sand, and August 22, 1973 on the silt loam. The 1974 study was planted on June 5, and the sweet corn alone treatment was harvested on August 23; whereas, the sweet corn-soybean treatments were harvested 3 days later. In all studies, 900 kg/ha of 10N-4.3P-8.3K fertilizer was applied broadcast before planting and 45 kg N/ha was sidedressed. To control weeds, the herbicide combination of alachlor [2-chloro2',6'-diethyl-N-(methoxymethyl)acetanilide] and dinoseb (2-sec-butyl-4,6-dinitrophenol) was applied after planting. Corn earworm (Heliothis zea Boddie) was controlled with 1.4 kg/ha carbaryl (1-naphthyl-A-methylcarbamate) applications at 35% and 90% silking. These pesticides are labeled for both sweet corn and soybeans. Sweet corn was hand harvested, and the stalk top broken over at the ear node after harvest. Whole ear and shucked ear yields were obtained and ear weights were determined. Soybean plants were hand harvested and threshed with a combine on Nov. 9, 1972. The soybean plants in both studies in 1973 and 1974 were hand harvested and threshed with the center 1 or 2 rows from the 3 and 4 row plots, respectively.

Soybeans grown in the same row with sweet corn are shown in Fig. 1. In 1972, soybeans at 17 and 20 cm plant spacings with sweet corn at 32 and 34 cm plant spacings appeared to cause a significant sweet corn yield reduction; however, the yield reduction was probably due to the wide sweet corn spacing as compared to a normal spacing of 25 cm rather than soybean competition (Table 1). Ear wt were not significantly reduced by the soybean co-cropping. Sweet corn yields were severely reduced by soybean competition with a 7 cm soybean plant spacing (Table 1); however, the sweet corn spacing of 18 cm could also have contributed to increased crop stress since the normal sweet corn spacing is 25 cm. These results indicated that sweet corn and soybean plant populations could be established which would produce decreased but still acceptable sweet corn yields. The co-cropped soybean yields were reduced 40 to 50% compared to soybeans alone (Table 1); however, yields of 1300 to 1700 kg/ha would provide a significant economic return.

Sweet corn yields in 1973 were reduced on Norfolk loamy sand with soybeans compared to sweet corn alone

Table 1. Results of 3 years of co-cropping 'NK-199' sweet corn and 'York' soybeans on a Norfolk loamy sand or Mattapex silt loam.

<table>
<thead>
<tr>
<th>Plant spacing (cm/plant)</th>
<th>Soybean</th>
<th>Sweet corn With husk (kg/ha)</th>
<th>Husked (kg/ha)</th>
<th>Ear wt (g)</th>
<th>Dry beans (kg/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1972 — Norfolk loamy sand)²</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>none</td>
<td>15,100 d</td>
<td>11,620 d</td>
<td>240 d</td>
<td>—</td>
</tr>
<tr>
<td>18</td>
<td>7</td>
<td>12,090 e</td>
<td>8,790 ef</td>
<td>210 e</td>
<td>1600 e</td>
</tr>
<tr>
<td>34</td>
<td>14</td>
<td>11,890 e</td>
<td>8,570 ef</td>
<td>200 e</td>
<td>1290 e</td>
</tr>
<tr>
<td>32</td>
<td>20</td>
<td>14,090 de</td>
<td>10,410 de</td>
<td>210 e</td>
<td>1590 e</td>
</tr>
<tr>
<td>none</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td>3430 d</td>
</tr>
<tr>
<td>(1973 — Norfolk loamy sand)²</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>none</td>
<td>11,860 g</td>
<td>9,500 ef</td>
<td>250 g</td>
<td>—</td>
</tr>
<tr>
<td>25</td>
<td>7.5</td>
<td>11,270 g</td>
<td>8,200 ef</td>
<td>240 g</td>
<td>1520 g</td>
</tr>
<tr>
<td>25</td>
<td>15.0</td>
<td>12,660 g</td>
<td>10,100 de</td>
<td>250 g</td>
<td>1340 g</td>
</tr>
<tr>
<td>none</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td>3430 d</td>
</tr>
<tr>
<td>(1973 — Mattapex silt loam)²</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>none</td>
<td>6670 h</td>
<td>5290 h</td>
<td>230 h</td>
<td>—</td>
</tr>
<tr>
<td>25</td>
<td>7.5</td>
<td>6270 h</td>
<td>4980 h</td>
<td>160 i</td>
<td>1410 h</td>
</tr>
<tr>
<td>17</td>
<td>15.0</td>
<td>5660 h</td>
<td>4480 h</td>
<td>160 i</td>
<td>1160 i</td>
</tr>
</tbody>
</table>

²Mean separation within columns for each year and soil type by Duncan’s multiple range test, 5% level.
³Planted May 25 and grown without irrigation.
⁴Planted May 10 and grown with irrigation when needed.
⁵Planted June 14 and grown without irrigation.
⁶Planted June 5 and grown with irrigation when needed.

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In the Mattapex silt loam, sweet corn yields were not reduced when co-cropped with soybeans (Table 1). Soybeans yielded 40 to 45% of a normal yield when co-cropped with sweet corn in 1973 (Table 1). In 1974, sweet corn yields were not reduced when co-cropped with soybeans (Table 1) and the soybeans produced 1410 and 1160 kg/ha yields. Soybeans co-cropped with sweet corn appeared to cause a 2 to 3 day delay of sweet corn maturity in 1972 and 1973 on both soil types. Therefore, in 1974, the sweet corn co-cropped with soybeans was harvested 3 days after the sweet corn alone to compensate for the maturity delay. The sweet corn stalks rapidly dry and decompose after harvest, and these stalks would not affect soybean harvest in Oct. or Nov.

These studies have shown that sweet corn and soybeans can be grown together in the same row with acceptable sweet corn yields and the soybean yields were about 50% of normal after the sweet corn has been harvested. A soybean yield of 1400 kg/ha in addition to a normal sweet corn yield would significantly improve the net return per ha since the only additional production costs for the soybeans are the seed, planting, and harvesting. Since the soybean yields have shown a small response to the soybean spacing from 0 to 20 cm (Table 1), the co-cropping system can utilize a low soybean population which would minimize the stress on the sweet corn. This co-cropping system appears suitable for most sweet corn planting dates in Maryland. Sweet corn grown with soybeans often appeared darker green and more vigorous than the sweet corn alone which suggests perhaps nitrogen fixation by the soybeans may benefit the sweet corn.

In 1974 and 1975, about 40 ha of co-cropped sweet corn and soybeans were harvested by 3 growers in Maryland each year. The current recommendations for co-cropping are to plant sweet corn at the normal population and then plant soybeans with an 11 cm spacing in the same row for a 0.91 m row width.

In 1973 and 1974, 'Swiss' was crossed to a cultivar name is probably 'Declivis Remus', 'Remus' in the U.S. (Park Seed Co., 1976), but this has not been confirmed. The F2 populations were derived from a cross between 'Swiss' and a P. vulgaris coccineus derived line with long racemes, usually 10—20 cm (Table 1).

Dr. A. P. Lorz crossed numerous P. vulgaris and P. coccineus (Lam.) lines during the period 1960—1970. Progeny from these crosses were selected for vulgaris-type pods, fertility, general adaptation, colored seeds, and long racemes. During the period 1970—1973, single plant selections for long racemes were made by the author. In the fall of 1973 and 1974, 'Swiss' was crossed to a series of these coccineus-derived, inbred lines selected for raceme length. The F2 progenies reported below were classified in the spring of 1975 for normal and re-


The Inheritance of the Reclining Foliage Character in Beans and its Potential Value when Combined with Long Racemes

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Additional index words. vegetable breeding, plant architecture, Phaseolus vulgaris

Abstract. Segregation in F2 populations of Phaseolus vulgaris L. indicates that the reclining foliage character (RF) is controlled by a single recessive gene, rf. The expression of rf appears to be modified by either a recessive or a dominant epistatic factor occurring in some other lines. The RF character contributes to lodging resistance and many reduce yield losses of pods from mechanical harvest when combined with long racemes.

The petioles of normal bean plants are erect at various angles. Bean plants with the reclining foliage character have the majority of their petioles slanting downward (Fig. 1). The margins of some of the lower leaves often touch the ground as a consequence. The reclining foliage (RF) character causes the leaves to be closer to the ground, providing a lower profile to winds than normal plants and thus increasing lodging resistance. The pods of RF plants are fully exposed above the foliage (Fig. 2). During mechanical harvest the tines of the harvesting reel must ordinarily pass through all of the foliage and branches of the normal plant to reach the pedicles of the pods. There should be less likelihood for pods of RF plants to get caught in the foliage and branches, and thus be broken or dropped to the ground. Also, hand harvest of the pods would be less laborious with RF plants. In environments where fungal diseases of the pods are serious problems, eg. white mold, Schlerotinia sclerotiorum (Lib.) de Bary, it would be advantageous to have the pods well exposed for better coverage with fungicides. Also, increased air movement around the pods and direct sunlight would provide an environment less favorable to the spread of fungal diseases. The inheritance of the RF trait is reported here.

The P. vulgaris germplasm source of RF was obtained in 1972 from Switzerland and is designated 'Swiss'. The true

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