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Row spacing, nitrogen affect bean yields

Oregon 1604 bush snap beans were planted on May 18, 1976, in 12- and 36-inch rows at the OSU Vegetable Research Farm. Spacing of plants in the row was about 3 to 4 inches for 12-inch rows and 1½ to 2 inches in the 36-inch rows. Four nitrogen fertilizer rates were: 50, 100, 150 and 200 pounds N per acre. Fifty pounds N per acre were supplied to plots in a band application with the P and K fertilizer; additional N was applied as ammonium nitrate broadcast after planting. The 100 pound N treatment received the initial N application at planting plus 50 pounds N per acre when plants were at the second trifoliate leaf stage of growth; the 150 pound N treatment received the above plus an additional 50 pounds N application at early bloom; and the 200 pound N treatment received all of the above plus 50 pounds N per acre when pods were small. Irrigation was supplied at about seven to 10-day intervals. All plots were irrigated after each application of N sidedress fertilizer. Plots were harvested once-over by hand to simulate machine harvest.

Data on yield and sieve size distribution of pods, shown in Table 1, indicate that average yield was highest at the 100 pound N rate but there was no significant difference between N rates. Yield of 12-inch rows was 36 per cent higher than from 36-inch rows which was statistically significant. There was a slightly higher percentage of sieve size 1-4 pods in 12-inch rows than for 36-inch rows. The highest N rate had a lower percentage of 1-4 size pods than lower N rates indicating that the higher N application had a slight accelerating effect on maturity rather than a delay compared to the lowest N rate. There were no significant interactions between row spacings and N rates.

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Table 1. Effects of row spacing and nitrogen rates on yield and sieve size distribution of snap beans, Corvallis, 1976

	12-inch rows		36-inch rows		N rate average	
N rates lbs/A	T/A	% 1-4	T/A	% 1-4	T/A	% 1-4
50	10.0	45	6.8	45	8.4	45
100	11.4	46	7.5	41	9.5	43
150	9.3	44	8.1	44	8.7	44
200	9.9	43	7.6	37	8.8	40
Row spacing average	10.2	44	7.5	42		

Bush bean yield and sieve size relationships

The relationship between yield and sieve size is important in assessing potential economic returns from snap beans. One reason is that inherent differences -- in maturity rates, potential sizes of pods, yield, seed development and other quality characteristics -- may be noted in comparing varieties and treatment effects.

In experimental plantings, an adjustment is desirable to relate changes in sieve size distribution and yields so treatments can be evaluated at comparable stages of maturity. Experiments designed to allow for several harvest dates for a given treatment are not always possible.

Several varieties were grown in small experimental plantings at Corvallis in three years. Once-over hand harvests were made at two to four day intervals. At each harvest date for each variety, yields were calculated and sieve sizes obtained by a commercial bean grader.

The accompanying graphs in Figures 1, 2, and 3 show the average relationships of yield and sieve sizes 1-4 (per cent 4's + smaller). Yield changes ranged from .086 tons per acre for each one per cent change in sieve size 1-4 pods in Fig 1, .058 tons per acre in Fig 2, and .064 tons per acre for each one per cent change in sieve size in Fig 3. It can be seen that the slopes of the lines are different for the three years and there may be some differences between varieties in some cases, but figures are based on average response with data from all varieties pooled.

If the change in yield were expressed as a per cent change in relation to a certain per cent change in sieve size 1-4 pods, rather than in tons per acre, this would vary according to where the data were located on the graph. For example, the per cent change in yield for each 1 per cent change in sieve size 1-4 pods would be greater when yields were small than later in the season when yields were higher. Similar relationships would be found for the three graphs although varieties and slopes of the lines are different.

Data in these graphs may be useful for adjusting yields to a certain sieve size, say 50 per cent 1-4's, but it should be recognized that there are limitations of such adjustments. Adjustments would

appear to be most accurate when sieve size ranges are not greatly different between treatments and probably would be best adapted to varieties with larger potential sizes than those that tend to be smaller sieve size at optimum maturity for best quality. Also, the overall ranges of yield should be similar for best use of an adjustment factor. To obtain a useful and reliable adjustment factor further detailed work is needed with careful variety comparisons being made.

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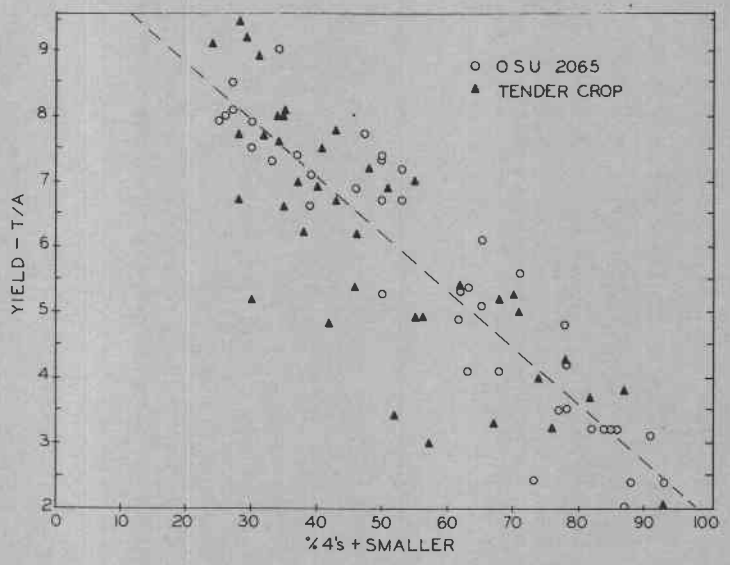

Figure 1. Relationship between yield and sieve sizes of snap beans; 2 varieties, 8 planting dates, 5 harvest dates, 1965; Y = 10.490 - .086 X, R = -.88

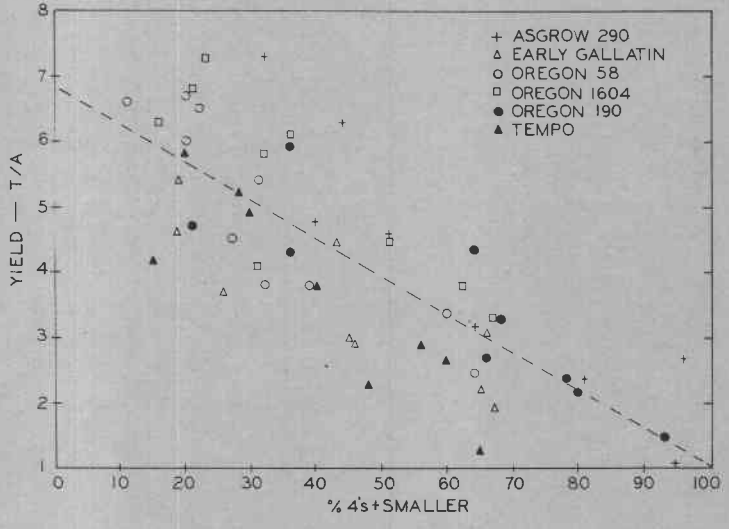

Figure 2. Relationship between yield and sieve sizes of snap beans; 6 varieties, 3 planting dates, 3 harvest dates, 1973; Y = 6.828 - .058 X, R = -.81

(Continued)

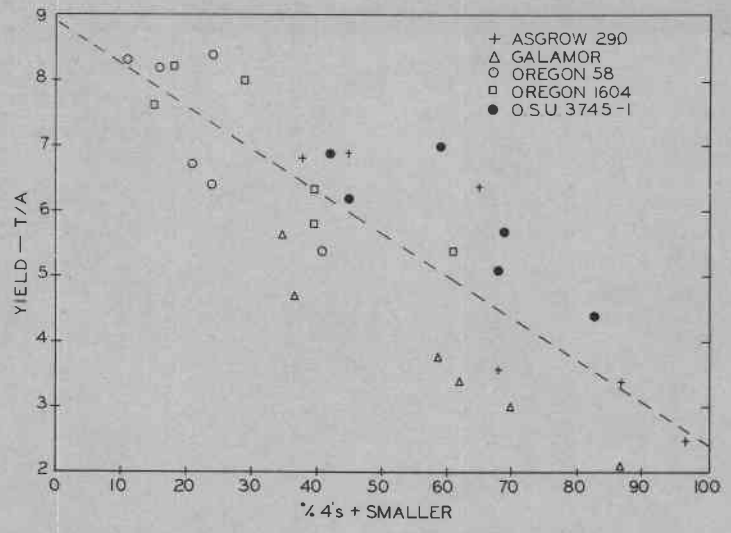

Figure 3. Relationship between yield and sieve sizes of snap beans; 5 varieties, 6 harvest dates, 1976; Y = 8.847 - .064 X,R = -.84

Topping of sweet corn

Most of the acreage of sweet corn grown for processing in Oregon is topped. Topping is removal of stalks above the uppermost ear before harvest. Reduction of lodging, ease of moving pipe for late irrigation, and increased ease and efficiency of mechanical harvesting are the major reasons given for topping.

In the early 1960's, experiments were conducted at Corvallis on small plots to evaluate time and severity of hand topping on yield of sweet corn, principally Golden Cross Bantam variety. Yield reduction (12 to 45 per cent) was highest when no leaves were left above the ears. When four leaves remained above the ears, reduction was much less, and in some cases, no reduction in yield occurred. Other treatments were intermediate. Also, as might be expected, there was a trend for greater yield loss when topping was done at full silk stage of growth, as compared to topping one and two weeks after silking. When topping was done one week after full silk with two leaves remaining above the top ear, yield averaged 10 per cent less than for check plots (with no topping) for three years of trials.

In 1974 and 1976, topping and within-row spacing variables were investigated on several sweet corn varieties. For both years the topping was to remove stalks so two leaves remained above the ear. Time of topping varied from about 8 to 14 days after silking in 1974 and 10 days after silking in 1976.

Data in Table 1 show that topping reduced yield about 8 per cent on the average in 1974 and 13 per cent in 1976. The range for yield loss for varieties in 1976 was 4 to 26 per cent with Fanfare and Reliance showing a significant yield reduction from topping. These results indicate that the average potential yield loss is about 10 to 12 per cent when plants are topped about 7 to 10 days after silking which is in agreement with earlier work. There should be less yield loss if topping is done later. There may be differential responses of varieties to topping but further observations are needed before these are clearly and consistently demonstrated.

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Table 1. Effect of topping on sweet corn varieties, Corvallis

Variety	% Reduction in Yield 1974	1976
Jubilee	6	7
Rapidpak	0	4
Fanfare	10	26
70-2367	10	-
Tendertreat	10	-
Eversweet	11	-
Niag 2004	8	-
Reliance	-	25
H 74203	-	9
Golden Cross Bantam	-	6
Approx. Avg.	8	13

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