A COMPARISON OF SINGLE AND DOUBLE ROW PLANTINGS OF BUSH GREEN BEANS

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Square (or triangular) planting of bush beans, which has been shown in many studies to be more productive than conventional row plantings, has a limited chance of adoption by growers because of the impracticality of precision planting and greater potential for mold diseases. Double row planting, which is a rearrangement of plants at a density the same as that in a single row, increases interplant distances. The aim of the present study was to evaluate the performance of 'Oregon 91G', one of the most extensively grown bush green beans for processing in Oregon, when planted in closely-spaced double rows compared to single rows at the same population densities.

Single and double row arrangements were compared at planting densities of 34.5, 43.2 and 51.8 plants/m^2 in 1986 (Expt. 1) and at planting densities of 34.5, 43.2, 51.8 and 60.4 plants/m^2 in 1987 (Expt. 2). Single rows were 76 cm apart and double rows were 15 cm apart on 76 cm centers. Prior to planting, an NPK fertilizer at 55 kg N, 74 kg P and 47 kg K/ha was machine banded on one side of single rows, 7.5 cm to the side of the seed. Double rows were planted an equal distance (7.5 cm) on each side of the fertilizer band. At flowering, additional N (ammonium nitrate) at 50 kg N/ha was banded halfway between the 76 cm rows. Plots were overseeded and shortly after emergence of seedlings thinned to appropriate stands. Standard weed and insect control and irrigation practices were used. Once-over hand harvest to simulate machine harvest was from 4.5 m of row in individual plots in Expt. 1 and from 6 m in Expt. 2.

Pod yields were significantly higher (14 percent) in double than in single rows in Expt. 1 (Table 1). A regression analysis showed no significant difference in yield at the various planting densities, although there was a slight increase in pod yields as density increased to 51.8 plants/m^2. Sieve size distribution of pods (by weight) in sizes 1-4 averaged 52 percent for single rows and 43 percent for double rows.

Data in Table 2 (Expt. 2) indicate that average yield of pods from double rows was significantly higher (9 percent) than from single rows. Highest yields were in the range of 43.2-51.8 plants/m^2 although there was no significant effect of density on yield. Average percentages of pods sieve sizes 1-4 were 70 for single rows and 72 for double rows. There were no significant interactions of row arrangement x density on yield in the two experiments.

Leaf area index (LAI) and individual plant dry weights were usually higher for double rows compared to plants in single rows (data not shown).

Further research seems justified in testing response of several cultivars to double rows compared to single rows and further evaluating flowering patterns, optimum time of harvest, response to fertilizers and irrigation, and degree of susceptibility to mold diseases. If further research shows yield increases from double rows to be substantial and consistent, then planters for seeding beans in double rows would need to be developed. It would appear that other input costs for double row plantings should be the same as those for single row plantings.

TABLE 1. Pod Yield (Mg/ha) for 'Oregon 91G'. Exp. 1. 1986. Rows 76 cm.

Row Arr.	Plants/M2			Row Arr. Means
	34.5	43.2	51.8	
Single	23.94	24.22	25.18	24.38
Double	27.08	27.08	29.24	27.80
Density Means	25.52	25.64	27.36	

LSD 5% Row Arr. Means = 0.54

Linear Regression for Density (independent variable) P = NS

TABLE 2. Pod Yield (Mg/ha) for 'Oregon 91G'. Exp. 2. 1987. Rows 76 cm.

Row Arr.	Plants/M2				Row Arr. Means
	34.5	43.2	51.8	60.4	
Single	22.00	24.07	23.40	21.35	22.70
Double	24.65	25.35	25.28	24.02	24.83
Density Means	23.33	24.71	24.34	22.68	

LSD 5% Row Arr. Means = 0.42

Linear Regression for Density (independent variable) P = NS