

**RESPONSE OF VARIOUS PLANT TYPE SELECTIONS TO ROW WIDTH
AND SEED RATES IN COMMON BEAN (*PHASEOLUS VULGARIS* L.)**

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Since the 1980's narrow row bean production and direct combine harvesting has steadily increased, particularly in new production areas of Ontario. Approximately 25 percent of the Ontario navy bean production area is devoted to this bean production practice. Along with these changes in bean production, improvement of upright plant cultivars has been one of the goals of the Harrow Research Station bean improvement program in order to meet grower's needs. This study was initiated to determine cultivar responses to various populations regulated by the row width and seed rate. Results are from three years of trials with four plant type cultivars in Ontario.

Four cultivars having determinate (Dresden), semi determinate (HR20-728 and Vista) and indeterminate vine (Ex Rico 23) growth habits were planted at narrow (30 cm) and conventional (60 cm) row spacings and at recommended (220,000 plants per hectare) and double (440,000 plants per hectare) plant populations. Plots were arranged in a randomized complete block design (RCBD) with four replicates. At harvest each plot was randomly split into two sections for comparison of harvest methods: conventional pulling and direct combine harvest.

Combined analysis of three year data indicated that there was a significant difference in seed yield among cultivars and between row widths (Table 1). Seed rate effects were not significant. Cultivars had significant yield differences for 2 of the 3 years. Row spacing of 30 cm was 20 % higher in yield than 60 cm in only 1 out of 3 years. Full season semi-determinate cultivars, HR20-728 and Vista had higher yields than that for Dresden and Ex Rico 23 (Table 1).

Increasing the seed rates did not have consistent effects on yield as result of environmental interactions over years. Rates of 220,000 (1X) seed per hectare was 13 % higher in yield in 1991 and 6% lower in 1990 than 440,000 (2X) seed rate. Row width by seed rate interactions (Table 2), were detected for seed yield over the three years. Significant year by cultivar and year by seed rate interactions were also detected for seed yield.

Yield differences from harvesting methods over the three years resulted in an 8% loss using direct combining as compared to conventional harvesting. Cultivar X row width and row width X seed rate interactions were significant for 1 out of 3 years only. Results indicate that direct harvesting is a possible management alternative with improved upright navy bean plant types.

Table 1. Mean yield of determinate, indeterminate and semideterminate types of white beans to narrow rows (30 cm), conventional rows (60 cm) and harvesting methods in Ontario.

| 1989-91 Yield Cultivar | Conventional Harvest | | Machine Harvest | |
|---------------------------|----------------------|-------|-----------------|-------|
| | 30 cm | 60 cm | 30 cm | 60 cm |
| | -----kg/ha----- | | | |
| Dresden | 3098 | 2795 | 2960 | 2695 |
| ExRico | 3128 | 2473 | 2759 | 2224 |
| HR20-728 | 3657 | 3058 | 3064 | 2838 |
| Vista | 3785 | 3480 | 3214 | 3120 |

Table 2. Mean yield of white bean cultivars to seeding rate and row spacing using conventional and machine harvesting.

| | Conventional Harvest | | Machine Harvest | |
|-----------|----------------------|-------|-----------------|-------|
| | 30 cm | 60 cm | 30 cm | 60 cm |
| Seed rate | -----kg/ha----- | | | |
| 1 X* | 3320 | 3047 | 2846 | 2893 |
| 2 X | 3514 | 2856 | 3152 | 2546 |

* 1 X = 220,000 seed per hectare; 2X = 440,000 seed per hectare