

## Nitrogen Rates for Edible Beans

### Purpose:

A 2000 kg/ha (1800 lb/ac) dry bean crop requires about 140 kg/ha (125 lb/ac) of nitrogen and removes about 89 kg/ha (80 lb/ac) in the seed. The rhizobia associated with dry beans are a different strain than those for soybeans, and are more sensitive to environmental factors. Dry beans obtain less than half their nitrogen requirement through fixation. Ontario nitrogen research has not demonstrated an economic response to applied nitrogen. However, it is common practice for dry bean growers to apply 33 - 67 kg/ha (30 - 60 lb/ac) of nitrogen. The goal of this project is to validate the OMAFRA recommended rate of nitrogen of zero nitrogen unless there is significant root rot present, in which case up to 100 kg/ha is suggested.

### Methods:

On-farm trials were established in fields without a history of manure or forage plow down. Four nitrogen rates (0, 40, 80, 120 lb/ac) were used at each location that included 2 or 3 replications. There were 10 sites established, 7 white beans, 1 black bean, 1 kidney, 2 cranberry beans. Nitrogen was applied at the time of planting, except for the kidney and cranberry bean sites which were planted in 76cm (30") rows. At these sites nitrogen was side dressed prior to flowering using 28% nitrogen delivered behind a coultter. Soil nitrate & ammonium was measured at planting and at maturity. A standard soil test was collected at each site.

### Results:

With the wet fall, harvest at a number of the sites was delayed. Two sites were hand harvested, collecting yield from 0.76 m (4 X 15 inch rows) X 1 meter at 4 locations within each nitrogen strip. At all locations there was a large increase in vegetative growth between nitrogen rates (Figure 1). There was little to no increase in yield from added nitrogen at the white bean sites (see Table 1). This was consistent across sites. The average increase in white bean yield was 0.9 lb/ac for each additional pound of nitrogen applied. At the coloured bean sites there was a bigger response to nitrogen. For instance, the 40 lb/ac nitrogen rate increased yield by 250 lb/ac over the check (0 N).

However, there were too few locations of each coloured bean type to make any conclusions. Fall soil nitrate values collected from each nitrogen rate showed only a slight increase in levels with higher N rates. There were no noticeable delays in maturity from the higher nitrogen rates. This would agree with research results. There was an increase in white mould versus the check, particularly with the 80 and 120 lb/ac nitrogen rate. The wet fall delayed harvest at many of the white bean sites which impacted yields. At higher nitrogen rates, the greater amount of vine and top growth resulted in more lodging. There was an increase in the amount of pods that dropped to the ground in areas with white mould infection.

Figure 1: Visual Observation of Dry Bean Vegetative Growth

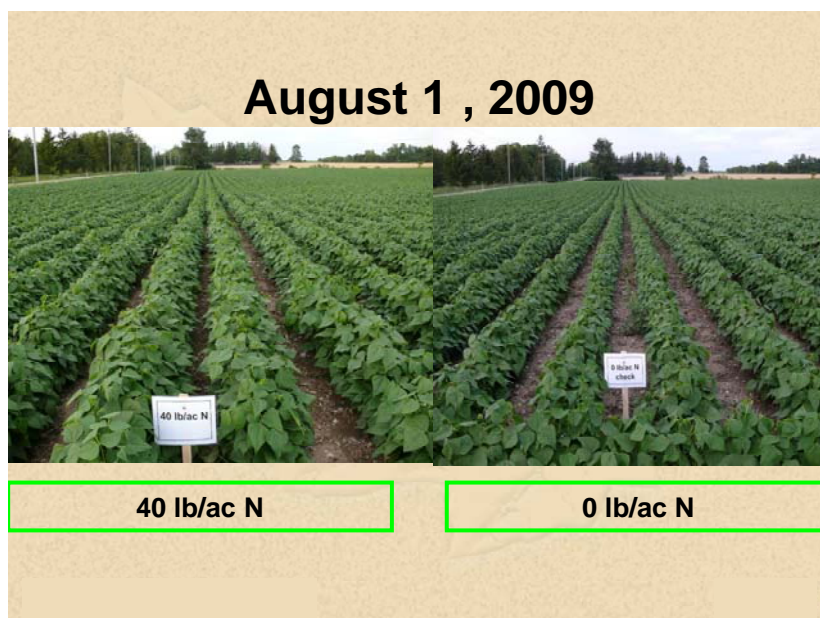


Table 1: 2009 Nitrogen Rates on Dry Bean Results

Location	Bean type	Nitrogen Rate (lb/ac)				Spring Soil N test kg/ha
		0	40	80	120	
Blyth <sup>1</sup>	White		2852	3081	2885	
Auburn*	White	2450	2258	2314	2510	50
Seaforth	White	2559	2454	2210	2219	104
Fullarton	White	3043	3052	2968	3531	84
Ripley	White	2866	2786	2911	3078	76
St Mary's	White	1829	1943	1895	1939	85
Fullarton	White	2804	2778	2857	2898	104
Thamesford*	Black	2591	2737	2749	2822	5
Thorndale	DRK	2544	2749	2881	2777	30
Thorndale	Cranberry	2559	2896	3012	2826	9.2
Denfield	Cranberry	1883	2196	2319	2370	92
<b>Average lb/ac</b>		<b>2513</b>	<b>2585</b>	<b>2612</b>	<b>2697</b>	
Average White beans		2592	2545	2526	2696	
Average Coloured		2394	2645	2740	2699	
* Hand harvested						

<sup>1</sup> Results excluded from average white bean results

**Summary:**

The first year of this project showed no yield increase in yield of white beans from nitrogen application, and a 250 lb/ac yield increase in coloured bean yields. There were two few coloured bean sites to make meaningful conclusion. There was some added pressure from white mould, likely due to the dramatic increase in plant growth at higher nitrogen rates.

**Next Steps:**

This project will be repeated in 2010, with hopes to include more cranberry and dark red kidney trials.

**Acknowledgements:**

- Ontario Coloured Bean Growers Assoc
- OSCIA- Nutrient Management Grant
- Huron Research Station of University of Guelph, Ridgetown
- Huron Soil & Crop Improvement Assoc

**Project Contacts:**

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**Location of Project Final Report:**