

# The Effect of Split Nitrogen Application Rate on Three Varieties of Industrial Hemp in Manitoba

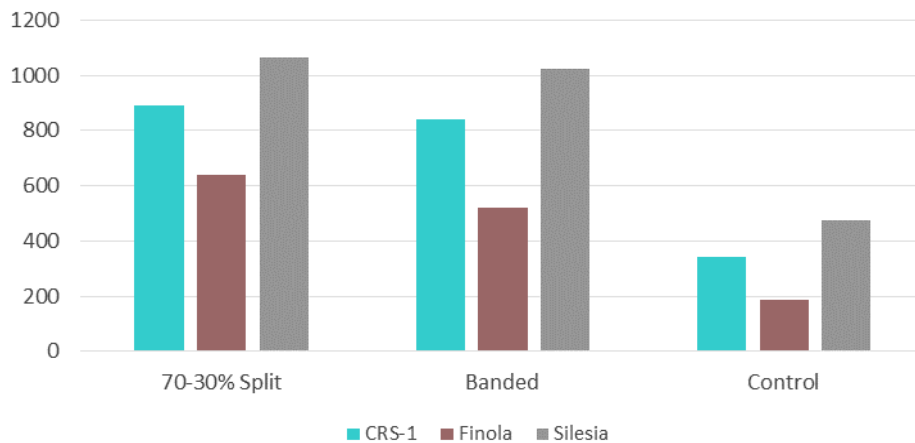
**Project duration** - May 2017 – September 2017

**Objectives** - To understand the effect of split versus banding nitrogen fertilizer to optimize industrial hemp grain yields.

**Collaborators** - Hemp Genetics, Parkland Industrial Hemp Growers, Manitoba Harvest

## Results

- Overall, despite the split nitrogen application averaging 13% greater grain yield, overall there was no statistically significant difference in grain yield when applying nitrogen in one application at seeding versus 70% at seeding and 30% at stem elongation.
- At Melita there was a significant effect on grain yield when nitrogen was divided into split applications. At Carberry, although split application resulted in greater yield it was not statistically different due to overall higher variability in the trial.
- There was no significant difference in height between a split application or single application of nitrogen.
- Further study is required to better understand and confirm any positive effect of split versus banding all nitrogen at time of seeding on grain yield.



*Figure 1. Effect of split nitrogen application on industrial hemp grain yield (kg/ha) combined over two Manitoba locations*

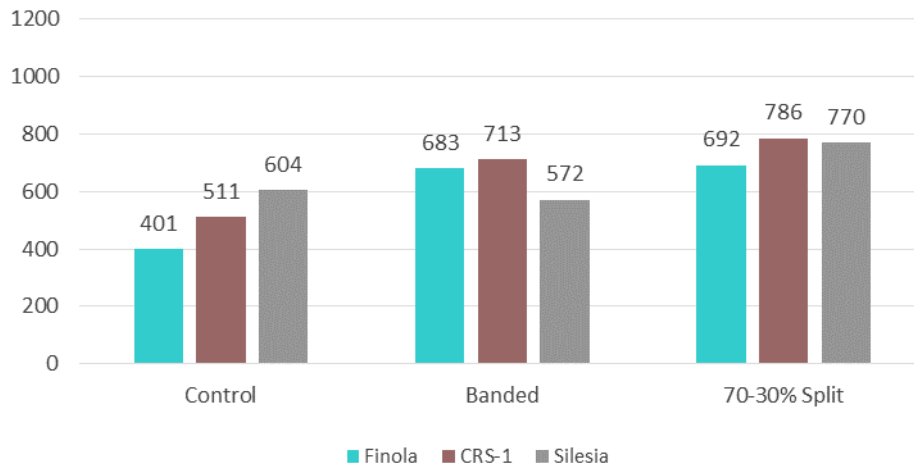


Figure 2. Effect of split nitrogen application on industrial hemp grain yield (kg/ha) at Carberry, Manitoba

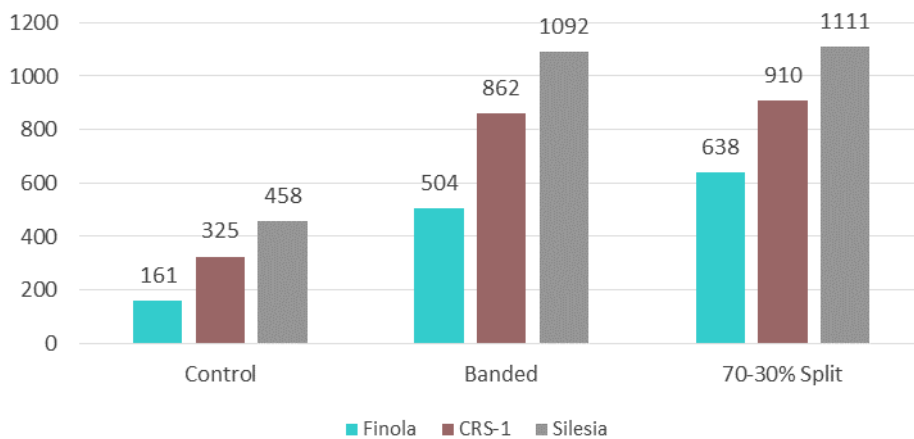


Figure 3. Effect of split nitrogen application on industrial hemp grain yield (kg/ha) at Melita, Manitoba

### Project findings

- Applying nitrogen at both sites resulted in a significant increase in grain yield.
- Applying nitrogen in a split format versus applying all at seeding increased grain yield at both sites; however, the increase was only significant at the Melita location.
- Lower yields at the Carberry site was most likely a result of below average rainfall, not allowing plants to fully utilize available nutrients.
- Further study is required to understand the potential benefit of split nitrogen application in industrial hemp.

### Background

Current nitrogen recommendations for nitrogen are 80-120 lb/ac, with some suggesting higher rates, depending on variety and growing conditions. However, the economic risk of applying all nitrogen at planting can be high, especially if prolonged stress restricts the plants' utilization of the added nutrients. Additionally, in many cases it is not logistically possible to apply all the

nutrient requirements at seeding. Split nitrogen applications have the potential to increase seeding efficiencies and allow growers to adjust rates of application according to growing conditions.

<http://www.hemptrade.ca/eguide/production/nutrient-use>

## **Materials & Methods**

Locations:	Carberry, Melita (Roblin results not included due to high %CV)
Experimental Design:	Split plot design with four replications
Main plot:	Silesia (tall, fibre-type) CRS-1 (medium, dual purpose-type) Finola (short, grain-type)
Split plot:	Control – no nitrogen added Banded – nitrogen side-banded at seeding Split application – 70% nitrogen side-banded at seeding, 30% broadcast at canopy closure
Data collected:	Seeding date Emergence date Plants/m <sup>2</sup> Mortality Vigor (1 low, 9 high) Height (cm) % Moisture Yield (kg/ha)

**Table 2: Agronomic info for all sites**

Item	Melita	Carberry	Roblin
Legal Location	NE 27-3-27W1		NE 20-25-28 W1
Soil Series	Waskada Loam	Wellwood Loam	Erikson Clay Loam
Soil Test (0-24")			
N - lbs/ac	7.2	33	86
P- ppm	11	64	10
K - ppm	260.8	673	183
S - lbs/ac	219.8	22	184
Burnoff Date	May 23	n/a	May 25
Product	Glyphosate/Liberty	n/a	RoundUp Transorb
Seed Date	May 24	May 19	May 24
Seed Depth	0.5"	1"	0.75"
Spring Fertilizer Application - lbs/ac	Variable N + Blend	46-0-0	
N	120/84+36	100/70+30	49
P	35	0	10
K	25	0	0
S	10	0	0
Spring Fertilizer Date	SB at Seeding + broadcast	SB at Seeding + broadcast	SB at Seeding + broadcast
In-crop Herbicides Date	June 16	N/A	N/A
Product	Koril/Arrow	N/A	N/A
Fibre Harvest Date	N/A	N/A	Aug 28
Grain Harvest Date	September 7		Sept 26