

The Effect of Seeding Rate on Industrial Hemp Fibre Yield and Mortality in Manitoba

Project duration - May 2017 – October 2017

Objectives - To understand the effect of seeding rate on plant/seed mortality and final fibre yield of industrial hemp.

Collaborators - Parkland Industrial Hemp Growers

Results

- Seedling mortality was constant at both the Melita and Carberry locations (Figure 1).
- At the Roblin site mortality increased with seeding rate.
- Increasing seeding rate resulted in a decrease in height.
- There as no significant difference in total fibre yield at Carberry or Roblin, only at Melita.
- In general, fibre yield reached a maximum at a target rate of 250 plants/m², however the recommended target rate of 150 plants was not significantly different from higher rates at all sites.

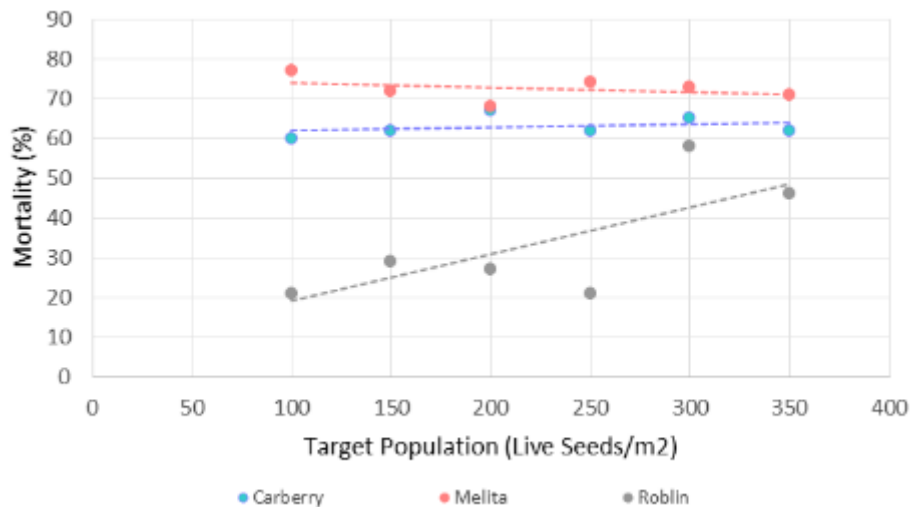


Figure 1. Seedling mortality rates relative to target planting populations at Melita, Carberry & Roblin, 2017.

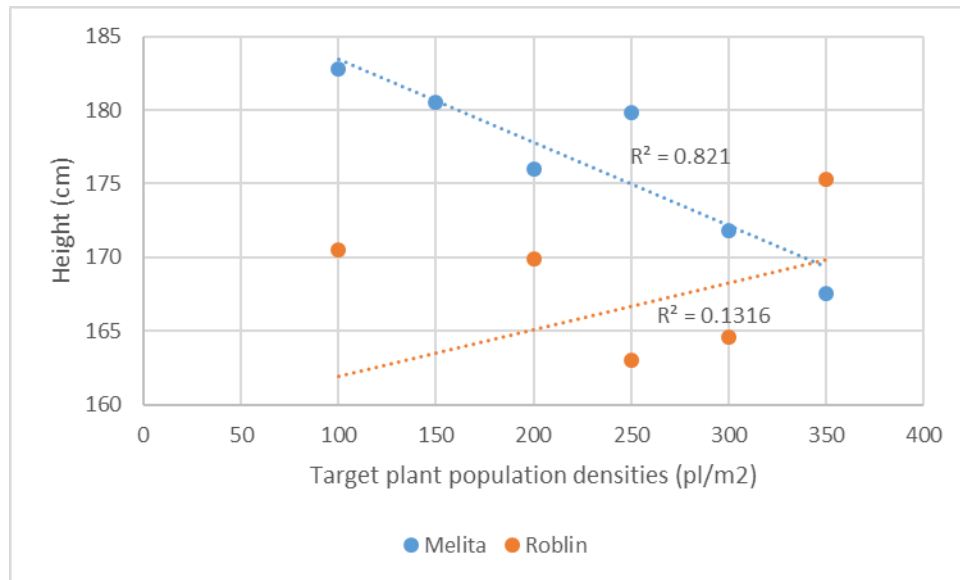


Figure 2. Effect of target population density on plant height in hemp at Melita and Roblin, Manitoba, 2017.

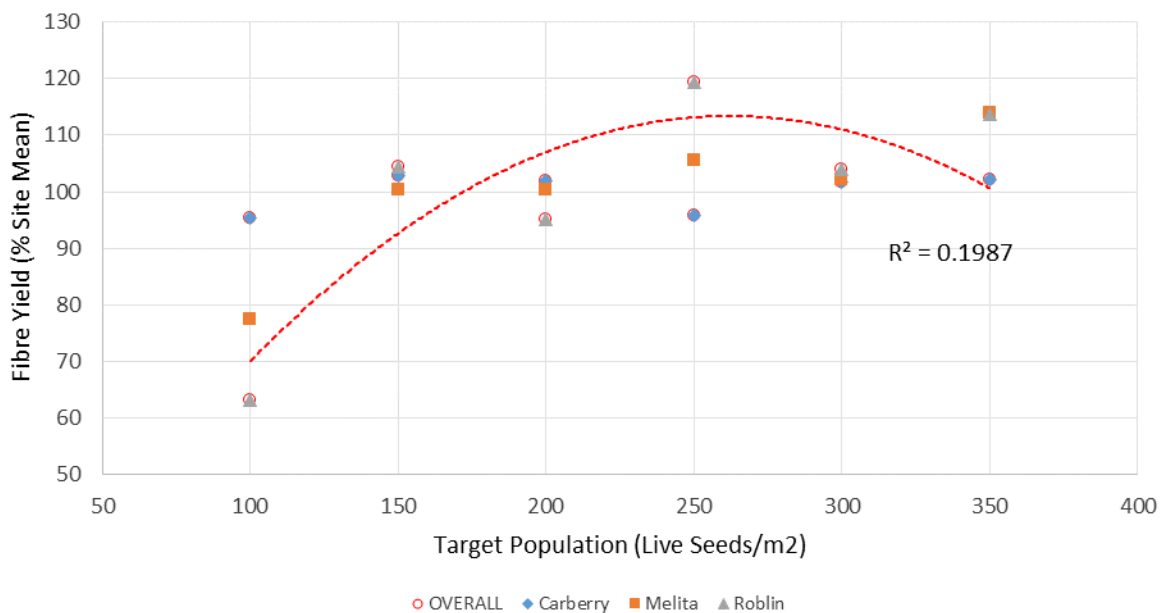


Figure 3. Effect of target population on hemp fibre yield at Carberry, Melita, and Robin Manitoba, 2017.

Project findings

This work supports previous work by the Diversification Centres focusing more specifically on grain varieties where mortality rates were constant and within a similar range regardless of the target plant population.

Roblin in 2017 was a bit of an anomaly with regard to mortality rates changing with increased population targets. This needs to be investigated further to better understand the mechanisms behind the different mortality rates.

Unfortunately weather data is missing for the Roblin site between June 2 and June 16 however, comparisons between sites from May 10th to June 10 (Figure 4).

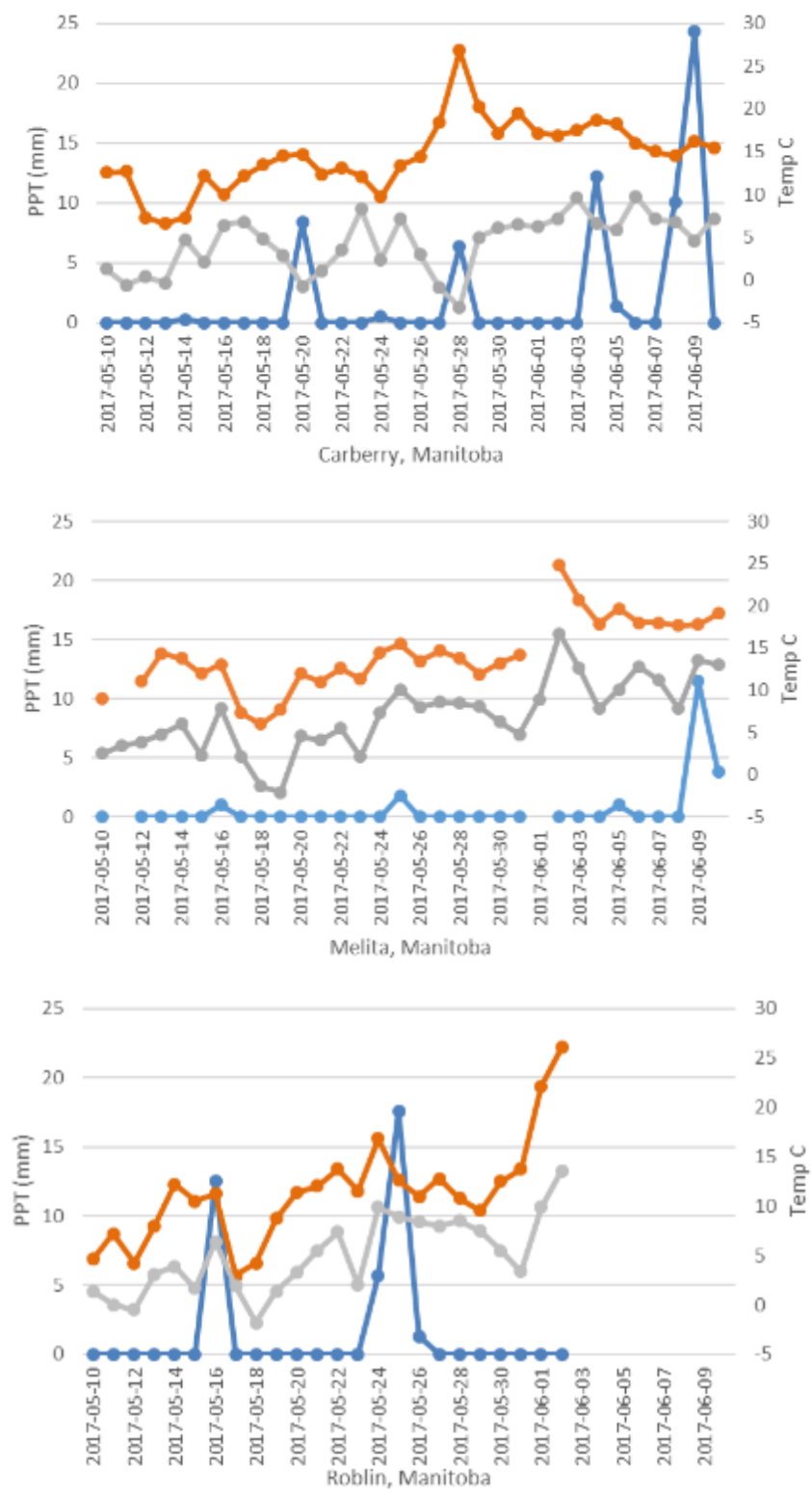


Figure 4. Weather data comparison

Overall, all sites had a moisture deficit relative to historical averages with Carberry, Melita and Roblin receiving 43%, 8% and 84% of 10yr average rainfall in May and the April prior was only at 63%, 80%, & 37% of normal, respectively. Moisture conditions at seeding for all sites was rated satisfactory. Both Melita and Carberry were similar with small rain events occurring around seeding but otherwise relatively fair to dry conditions with moderate temperatures. The Roblin site however, had a large rain event following seeding and cool temperatures. Given these differences however it would be expected that Roblin should have seen the largest levels of mortality and equal mortality across all plant populations which did not occur.

Future Work must focus more on environmental conditions during early stages of establishment, specifically soil conditions and the rate of emergence and seedling recruitment/death. The reasons why low stress weather conditions at both Carberry and Melita resulted in similar with mortality across all population levels verses the excess moisture and cooler temperatures at the Roblin site that resulted in different mortality rates across target populations needs to be explored in more detail.

Background

Mortality rates for industrial hemp can vary from 10-70% [1]. Nevertheless, the crop demonstrates the ability to adapt to different plant densities by altering its architecture (e.g. tall and thin vs. shorter and branched). Consequently, plant density has an impact on stem length and thickness. Higher seeding rates are used when targeting a hemp fibre crop. Varieties suited to fibre production typically have long, “pencil-thin” stems, sometimes exceeding two metres in height. Stem thickness affects the ratio of bast (long, outer fibres) and hurd (short, inner fibres), with thicker stems producing more hurd. This in turn affects the industrial application of the fibres.

<http://www.hemptrade.ca/equide/production/seeding>

<http://www.hemptrade.ca/equide/fibre-production/selecting-hemp-varieties-for-fibre-only-applications>

Materials & Methods

Experimental Design: Randomized complete block design

Entries: 5 (1 variety, 5 seeding rates)

Table 1: Treatments included in hemp fibre seeding rate trial, 2017

Variety	Seeding Rate (pl/m ²)
Canda	100
	200
	250
	300
	350

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	32	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 18	May 24
Seed Depth	0.5"	1"	0.75"
Spring Fertilizer Application - lbs/ac			
N	120	100	49
P	35	0	10
K	25	0	0
S	10	0	0
Spring Fertilizer Date	SB at Seeding	SB at Seeding	Side-banded at seeding
In-crop Herbicides Date	June 16	N/A	N/A
Product	Koril/Arrow	N/A	N/A
Fibre Harvest Date	August 10		Aug 18
Grain Harvest Date	August 31	N/A	Sept 4

References

Canadian Hemp Trade Alliance: Production, Seeding Rate. <http://www.hemptrade.ca/eguide/production/seedin>

