

# Determining agronomic suitability of European flax (linseed) cultivars in agro-Manitoba

**Project Duration** - 2018

## Objectives

The current study was developed to examine agronomic attributes (yield, height, maturity) of European-origin flaxseed cultivars if they had a competitive advantage and agro-climatic fit within Manitoba flax production areas.

## Collaborators

MFGA, PCDF, PESAI, WADO, BASF, Limagrain NL, van de Bilt zaden en vlas

## Results

Immediate yield results showed no statistical difference between European-origin lines and the Canadian-derived check, CDC Bethune at two of three diversification sites. At Melita (WADO), significant differences were apparent, although no difference existed between the check variety and the highest yielding European flax variety.

## Project findings

Dry, and drought-like conditions at the test sites contributed to lower overall yields in flax production, as evidenced by low commercial yield in the area according to MASC (Table 1). Short-stature flax was a result of continued moisture stress, along with overall thinner than ideal stands and the opportunity for weed competition. European flax lines were consistently shorter when compared to CDC Bethune, ranging from 6 to 10 centimetres shorter than check variety height at 53.7cm (Table 2). Overall days to maturity were +1 to -5 days from the check CDC Bethune (87 days) (Table 3). Correspondingly, flowering period in European flax varieties was +1 to -7 days in variance from the average 21 day flowering period of CDC Bethune (Table 4).

*Table 1. Yield Comparisons in European Flaxseed Test at different diversification centres.*

VARIETY	2018 Yield					
	Arborg		Melita		Roblin	
	kg/ha	bu/ac	kg/ha	bu/ac	kg/ha	bu/ac
CDC Bethune	1675	26.6	2226	35.4	2057	32.7
FX 204	1673	26.6	2168	34.5	1959	31.1
FX 305	1717	27.3	2313	36.8	1598	25.4
FX 406	1559	24.8	1973	31.4	1669	26.5
FX 511	1357	21.6	2156	34.3	1518	24.1
FX 608	1361	21.7	2116	33.6	1564	24.9
FX 707	1447	23.0	1840	29.3	1608	25.6
CV%	9.1		3.7		14.8	
LSD	-	-	140	2.2	-	-
Sign Diff	No		Yes		No	
Seeding date	22-May		07-May		22-May	
Harvesting date	20-Sep		14-Aug		11-Oct	

*Table 2. Mature plant height (in centimetres) of European lines against CDC Bethune check.*

Variety	Arborg	Melita	Roblin	Average	+/- Check
CDC Bethune	43.8	62.0	55.3	53.7	0
FX 204	35.7	51.7	55.7	47.7	-6
FX 305	37.8	51.7	46.0	45.2	-9
FX 406	39.7	53.3	48.0	47.0	-7
FX 511	36.8	49.3	45.7	43.9	-10
FX 608	36.2	50.0	46.3	44.2	-10
FX 707	41.3	46.0	45.3	44.2	-10

Table 3. Days to maturity of European lines against CDC Bethune check.

Variety	Arborg	Melita	Roblin	Average	+/- Check
CDC Bethune	95	84	82	87	0
FX 204	98	86	81	88	+1
FX 305	94	85	79	86	-1
FX 406	91	84	77	84	-3
FX 511	90	83	74	82	-5
FX 608	91	84	79	85	-2
FX 707	91	84	76	84	-3

Table 4. Length of flowering period (in days) in European flax cultivars.

Variety	Arborg	Melita	Roblin	Average	+/- Check
CDC Bethune	29	22	11	21	0
FX 204	31	25	11	22	+1
FX 305	20	15	10	15	-6
FX 406	13	22	11	15	-6
FX 511	16	17	11	15	-6
FX 608	16	22	12	17	-4
FX 707	16	12	13	14	-7

## Background

With the declining popularity of flax as a rotational crop choice in Manitoba, farmers need incentive to grow a crop like flax. A longstanding complaint is that current flax cultivars are not keeping up with yield advances, similar to gains made in canola, soybeans and to a lesser extent, cereals. This disparity is what encourages a switch away from flax and into higher-yielding, more profitable crops. Flax does have an important role to fill in Manitoba. As a non-host crop for many of the major diseases in western Canada, flax is well suited to break disease cycles and provide a stable, steady return as part of a balanced crop rotation. With the closure of private breeding programs at Nutrien Ag Solutions, and the public breeding programs at Agriculture and Agri-Food Canada, only a single breeder of flax remains in Canada at the Crop Development Centre. With the introduction and evaluation of European lines, there may be the possibility of a higher yielding cultivar, or a cultivar with more desirable quality characteristics may be found to be well suited to Manitoba's agro-climate.

Currently, testing is underway at the University of Saskatchewan to determine oil content, fatty acid profile and other desirable characteristics. Further data will be communicated upon completion of this project.

## **Materials & Methods**

*Experimental Design* – Randomized Complete Block Design

*Treatments* – Six Flax varieties of European origin along with a check variety, CDC Bethune grown in plots, all treated identically at a single site for fertility (values given on per acre basis), and weed control as per PRCO standards for Linseed Co-op testing.

- Arborg – 50lbs N, 20lbs P<sub>2</sub>O<sub>5</sub>
- Melita – 102lbs N, 35lbs P<sub>2</sub>O<sub>5</sub>, 24lbs K<sub>2</sub>O, 9lbs S
- Roblin – 79lbs N, 10lbs P<sub>2</sub>O<sub>5</sub>

*Varieties* – CDC Bethune, FX204, FX305, FX406, FX511, FX608, FX707.

*Seeding rate* – 40lbs/acre, adjusted for individual variety germination percentage

*Plot size* -

- Arborg – 7.1m<sup>2</sup>
- Melita – 12.27m<sup>2</sup>
- Roblin – 5.98m<sup>2</sup>

*Data collected* – yield, plant height at maturity, days to maturity, flowering period

### ***Agronomic information***

*Stubble, soil type* –

- Arborg – fallow, heavy clay soil
- Melita – wheat, Waskada loam
- Roblin – oat/barley silage, Erickson clay loam