

Industrial Hemp

An Eastern Canadian Perspective



UniSeeds

Marc Bercier & Hannah Windatt



UniSeeds works collaboratively with agricultural producers to serve the agricultural market and improve life through plant genetics.

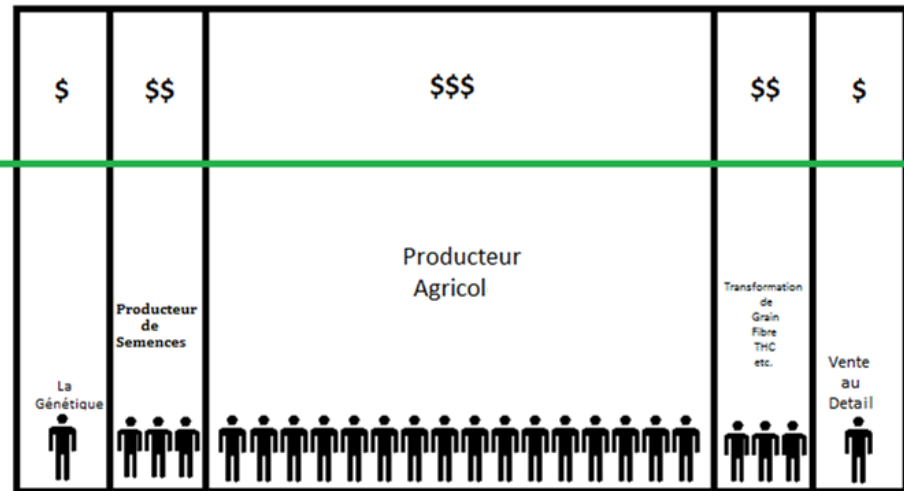
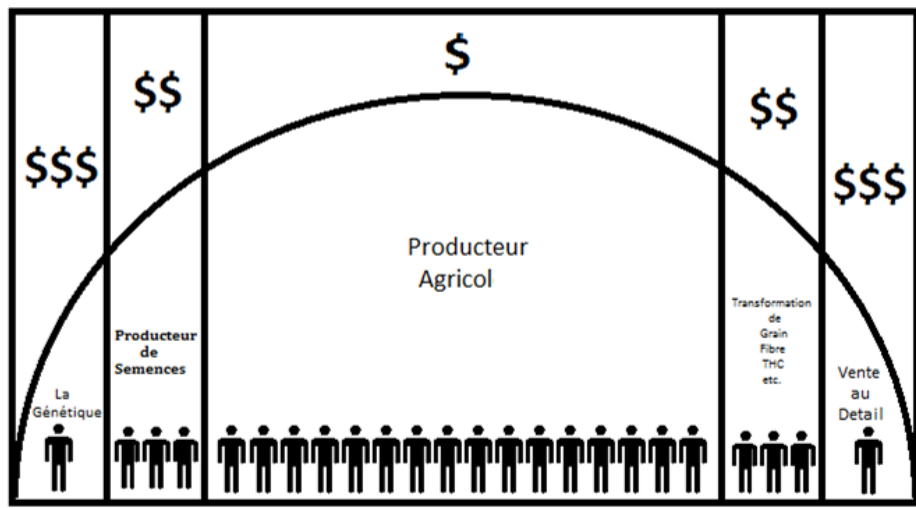
We are farmers serving farmers.



Centre de Criblage
Marc Bercier
Seed cleaning



Mission



Le But:

Équilibrer la production entre les producteurs et l'industrie.

Vision

- Identify the market opportunities
- develop premium hemp genetics to serve those opportunities
- Overall create more value for our customers

Values

- Honesty, transparency, Integrity
- Respect, Accountability
- Innovation & Growth
- Excellence

Industrial Hemp In Canada

- The *Industrial Hemp Regulations* were introduced in 1998, Governed by Health Canada
- Regulations ensure that Canadian industrial hemp contains less than 0.3% THC (tetrahydrocannabinol) in plant tissue, and below 10ppm in foods
- Therefore, producers wishing to grow industrial hemp must apply for a growing license and can only grow those varieties approved by Health Canada.



Health
Canada

Santé
Canada



2018 List of Approved Cultivars



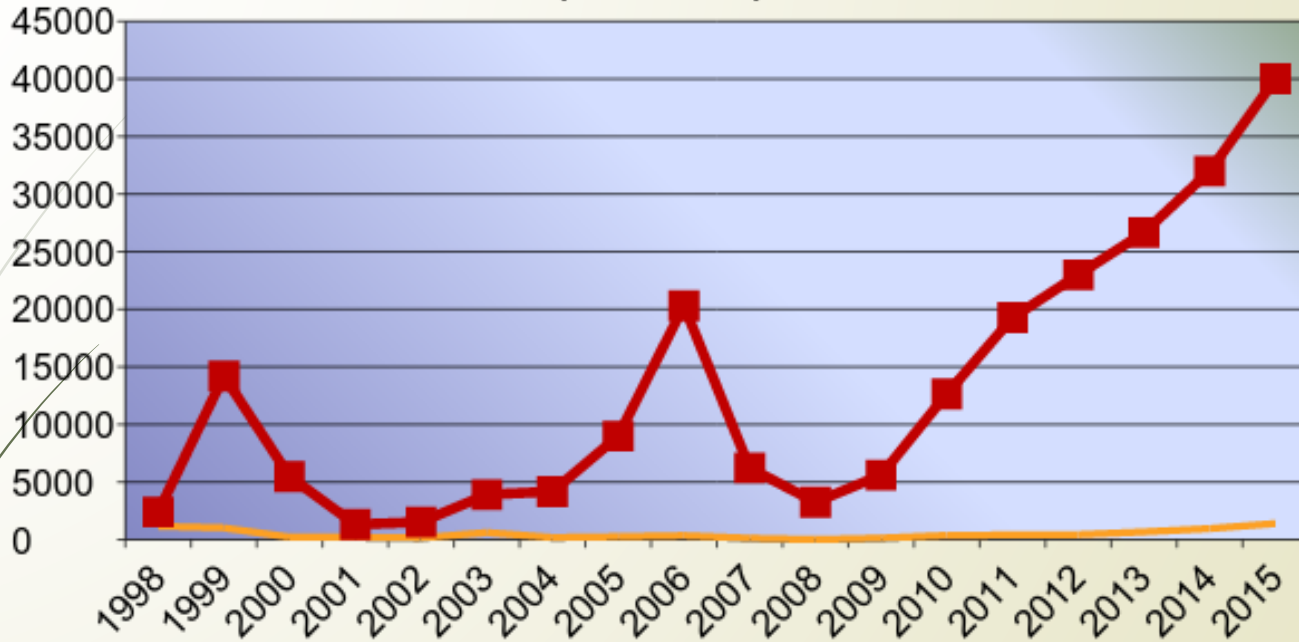
**OPIOID RESPONSE TEAM
INDUSTRIAL HEMP REGULATIONS
LIST OF APPROVED CULTIVARS
FOR THE 2018 GROWING SEASON
Cannabis sativa L.**

Pursuant to Subsection 39(1) of the *Industrial Hemp Regulations* and the Section 56(1) Class Exemption in Relation to the *Industrial Hemp Regulations*, the following industrial hemp varieties are approved for commercial cultivation under licence for the year 2018. The list may contain variety names that are synonyms for the same variety.

VARIETY	COUNTRY WHERE MAINTAINED	EXEMPT FROM THC TESTING under subsection 16(1) of the <i>Industrial Hemp Regulations</i> *
Altair	Canada	No
Alyssa	Canada	Exempt in MB and QC only
Angle	Canada	No
Anka	Canada	Exempt in ON and QC only
Canda	Canada	Yes
CanMa	Canada	Exempt in QC and SK only
Carmagnola	Italy	No
Carmen	Canada	No
CFX-1	Canada	Yes
CFX-2	Canada	Yes
Crag	Canada	Yes
CRS-1	Canada	Yes
CS	Italy	No
Delores	Canada	Exempt in AB and MB only
Deni	Canada	No
ESTA-1	Canada	No
Espresso	Germany	No

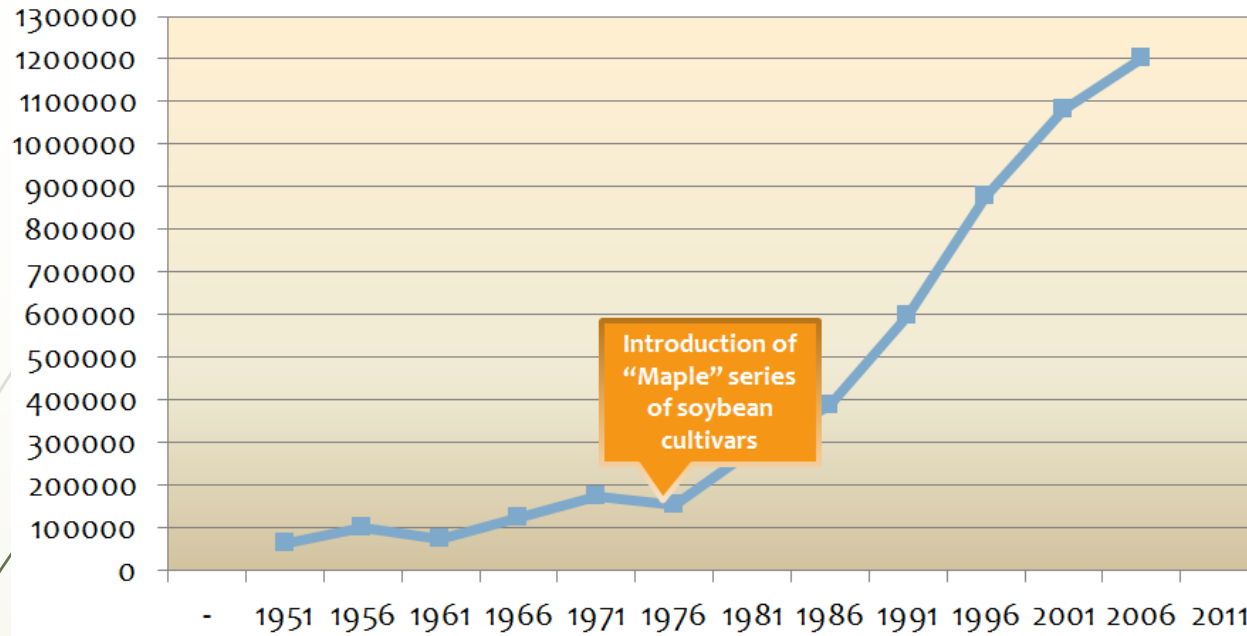
- 51 Varieties Approved in Canada
- Certified Seed System
 - Purity
 - Germination
 - Maintains THC levels
 - Maintain monoecious genetics

Commercial Hemp Production in Canada (hectares)



Since Canadian production of hemp restarted in 1998, the Canadian Industry has been experiencing 50% annual growth on average in processing volumes.

Production of Soybeans in Canada (hectares)



- Modern Hemp is following a similar path to Soybeans of the 1960's... on a tighter timeline
- In 1966 there were seven registered soybean varieties in trials in Ontario, there are now over 200

Markets



Hemp Grower Basics



Planting

- Site Selection
- Soil structure to avoid compaction

Seeding rates: 20-25 lb/ac

Planting depth: 0.5"-1.0"

Planting dates: May-15-June 30 , 120 days

- Variety selection

Monoecious: "One house", both male and females flowers are found on the same plant

Dioecious: Separate male and female flowering plants



Hemp Agronomy

- Very little industrial hemp agronomy information available in Eastern North America prior to 2015
- University of Vermont- UVM Extension's Northwest Crops & Soils Program 2016-17
- Cornell University 2017
- CHTA National Variety Trials - Eastern Canada 2018-19

2017 Planting Date Trials

- 2 sites in Ontario
- 1 site in Quebec
- Complete random block design
- 3-4 replications

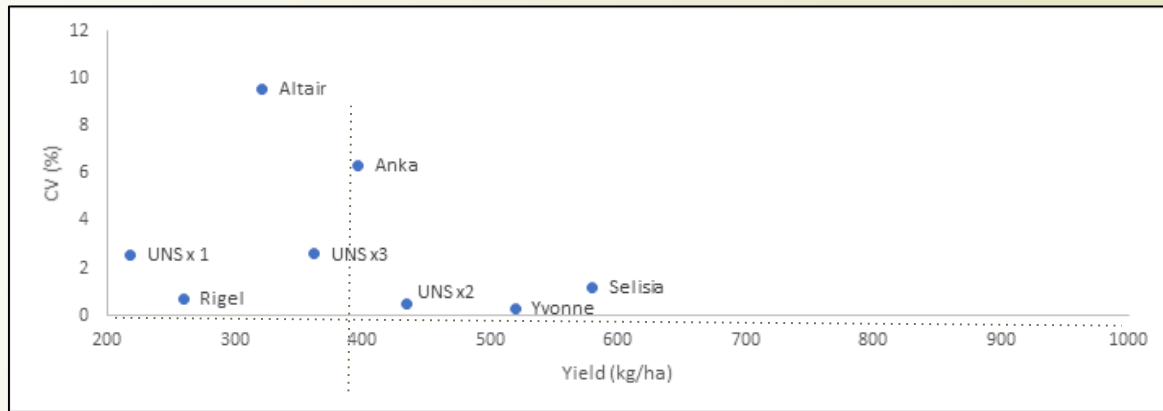


Figure 2: Average grain yields (kg/ha) and coefficient of variation (CV) of industrial hemp varieties grown at Valley Bio Ltd., Cobden ON, 2017. Varieties **planted on May 28th**. Dotted lines indicate the average yield and average coefficient of variation for all cultivars

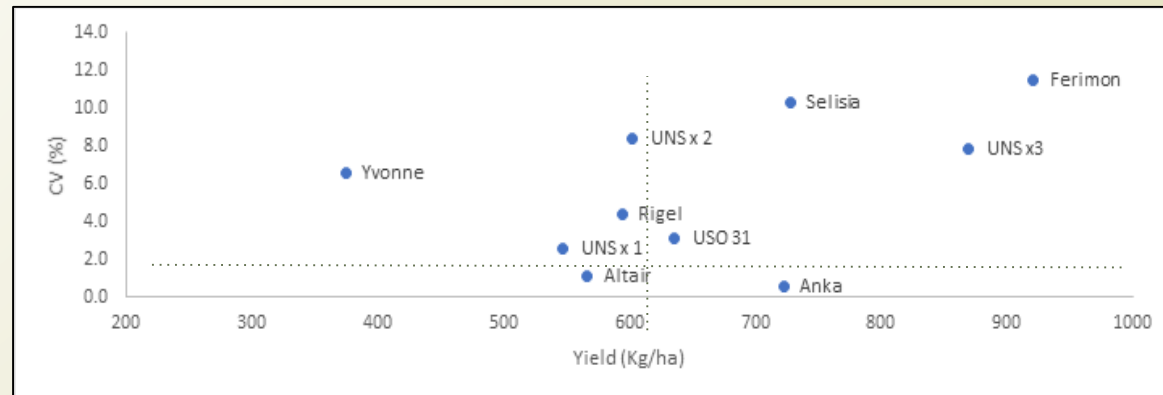


Figure 3: Average grain yields (kg/ha) and coefficient of variation (CV) of industrial hemp varieties grown at Valley Bio Ltd., Cobden ON, 2017. Varieties **planted on July 6th**. Dotted lines indicate the average yield and average coefficient of variation for all cultivars.

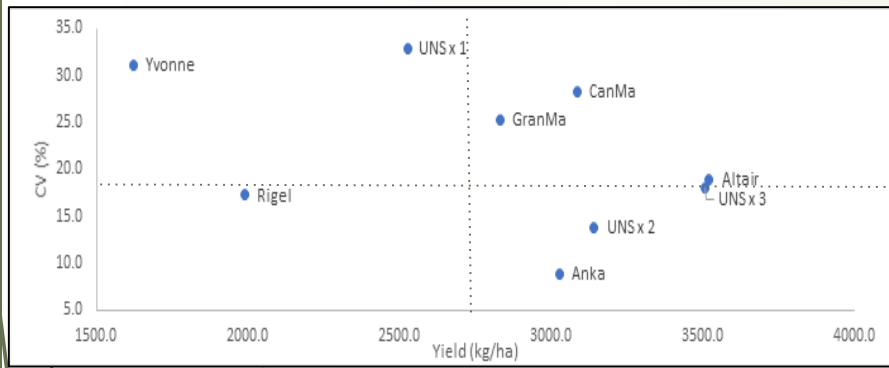


Figure 4: Average grain yields (kg/ha) and coefficient of variation (CV) of industrial hemp varieties grown at Cerela Inc., St. Hugues, QC 2017. Varieties **planted on May 20th**. Dotted lines indicate the average yield and average coefficient of variation for all cultivars.

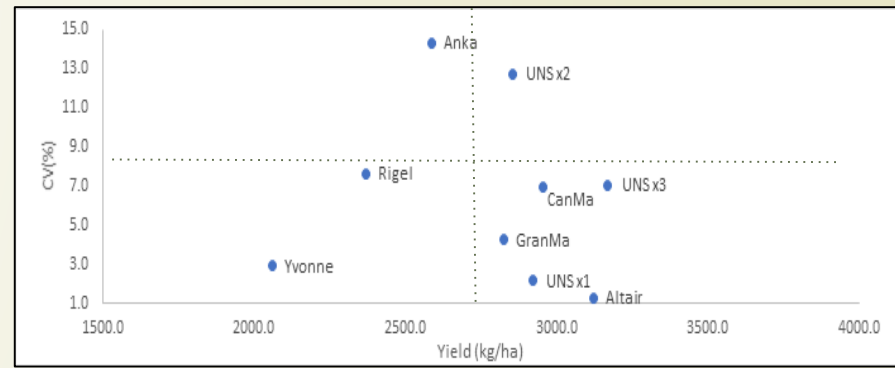


Figure 5: Average grain yields (kg/ha) and coefficient of variation (CV) of industrial hemp varieties grown at Cerela Inc., St. Hugues, QC 2017. Varieties **planted on June 1st**. Dotted lines indicate the average yield and average coefficient of variation for all cultivars

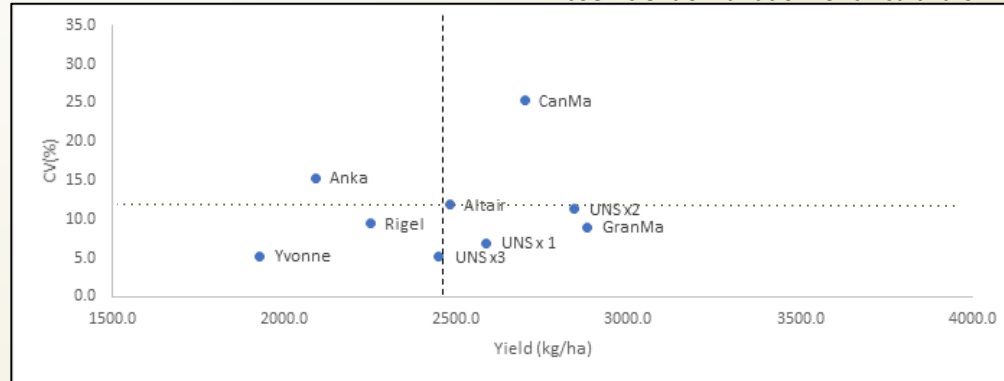


Figure 6: Average grain yields (kg/ha) and coefficient of variation (CV) of industrial hemp varieties grown at Cerela Inc., St. Hugues, QC 2017. Varieties **planted on June 15th**. Dotted lines indicate the average yield and average coefficient of variation for all cultivars.

Nutrient Up-take & Fertilization

	Total Plant (Kg.ha)		Grain (Kg/ha)		Uptake	*Suggested Rates
Nutrient	Hemp	Canola	Hemp	Canola	Hemp/day	Hemp
N	200	120	40	65	6.7	70 to 90lb (Actual N)
P	47	50	19	35	1.56	35 to 40lb
K	211	75	10	17	6	As req'd per soil test
S	14	20	3	12		As req'd per soil test

Source:(MAFRI)

Weeds, Disease and Pest Management



No registered pesticide in Canada

- European Corn Borer
- *Scerotinia* Spp. "White mould"

Organic

- Hemp plants need optimum planting conditions in order to out compete weeds
- Heavy Nutrient Feeders

Conventional

- Pre-plant burn-off
- Assure II to control grasses
- On-going trials through minor use program; Edge and Pardner



Harvest



Drying, Conditioning and Storage



Pre-Cleaning & The Importance of Drying

- Harvest around 24% moisture content and dry down to 8% for storage



Industrial Hemp Grain - Example Cost of Production

Based on a Minimum 10 acres of production at 42lb/bu and 8% m/c

Acreage 100

Grain Harvest Only CoP

	<i>Per acre</i>	<i>Totals</i>
Yield (lbs/ac)	1100	110000
Land cost (ac)		0
Seed cost (25lb/ac at \$2.5/lb certified)	62.5	6250
Field prep cultivation (ac)	40	4000
Fertilizer (ac)	70	7000
Seed Starter Fertilizer (ac)	15	1500
Fertilizer application (ac)	10	1000
Seeding (ac)	20	2000
THC testing	0	0
Harvesting (combine&short trucking)	50	5000
Drying (\$/lb)	17	1650
Storage	25	2500
Trucking to market (\$/mt)	13	1250
Cleaning (\$/lb)	0	0
Crop Insurance	18	1800
Licencing	1	50
Fall tillage	35	3500
Totals	375	37500

Breakeven cost (\$/lb)	\$ 0.34	
Sale Price	\$ 0.65	
Revenue	715.00	\$ 71,500.00
Return	340	34000
Total Tonnage	0.50	49.9
Bushels	26.19	2619
		90.7%

Cost of Production

Dual Crop Fiber CoP post grain harve. Per acre Totals

Yield (mt/ac)	2.5	250		
Stubble swathing (ac)	15	1500		
Harvester or Baler (ac)	75	7500		
Fiber Collection (mt)	25	2500	10 \$/mt	
Trucking to Market (mt)	75	7500	10 \$/mt	
Nutrient Removal Value (ac)	125	12500	30 \$/mt	
Totals	315	31500		

Breakeven cost (\$/mt)	\$126.00			
Sale Price	\$176.32		0.08 cent/lb	
Revenue	441	\$44,080.00		
Return	126	12,580.00	39.9%	

Combination Dual Purpose Crop Per acre Totals

Total Costs	690	69000		
Total Revenue	1156	11580		
Return	466	46580	67.5%	

Cost of
Production

WHAT'S GOING TO MAKE HEMP THE NEXT BREAK THROUGH CROP ON THE FARM?



	<u>2015</u>	<u>2025</u>
Acreage	100,000	1M
Economic Impact	\$50M	\$1B

Genetics & Agronomy

Hemp missed out on the "green revolution"



Regulatory Environments



Health Canada



CFIA-ACIA



Canadian Grain Commission
www.graincanada.gc.ca

- Controlled Substances Act
 - Review of the Industrial Hemp Framework (in progress)
 - Ease of access for growers
- Industry Oversight
 - Seed purity to food safety
- Canadian Grain Commission
 - Industry Standards

Production Techniques

Market Acceptance











Grower Resources



https://www.youtube.com/channel/UCm2hRq_XfqK3vQ5102-tiow

www.valleybio.com

www.hemptrade.ca

<http://www.uvm.edu/extension/cropsoil/hemp>

<http://hemp.cals.cornell.edu>



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www.uniseeds.ca