



# Cannabis Conundrum

Canadian Industrial Hemp Industry

**20 YEARS AND GROWING**

## PART 1 - Commercial Production

UNIVERSITY OF VERMONT EXTENSION

Northwest Crops and Soils Program

2019 Industrial Hemp Conference: "A Grower's Tutorial"

February 8, 2019

# STONE FARMS SINCE 1901

- 1100 acres crop
- Pedigree seed since 2010



ValleyBio

- Cleaning grain in 2012
- Registered Seed Establishment in 2014
- 6 Employees



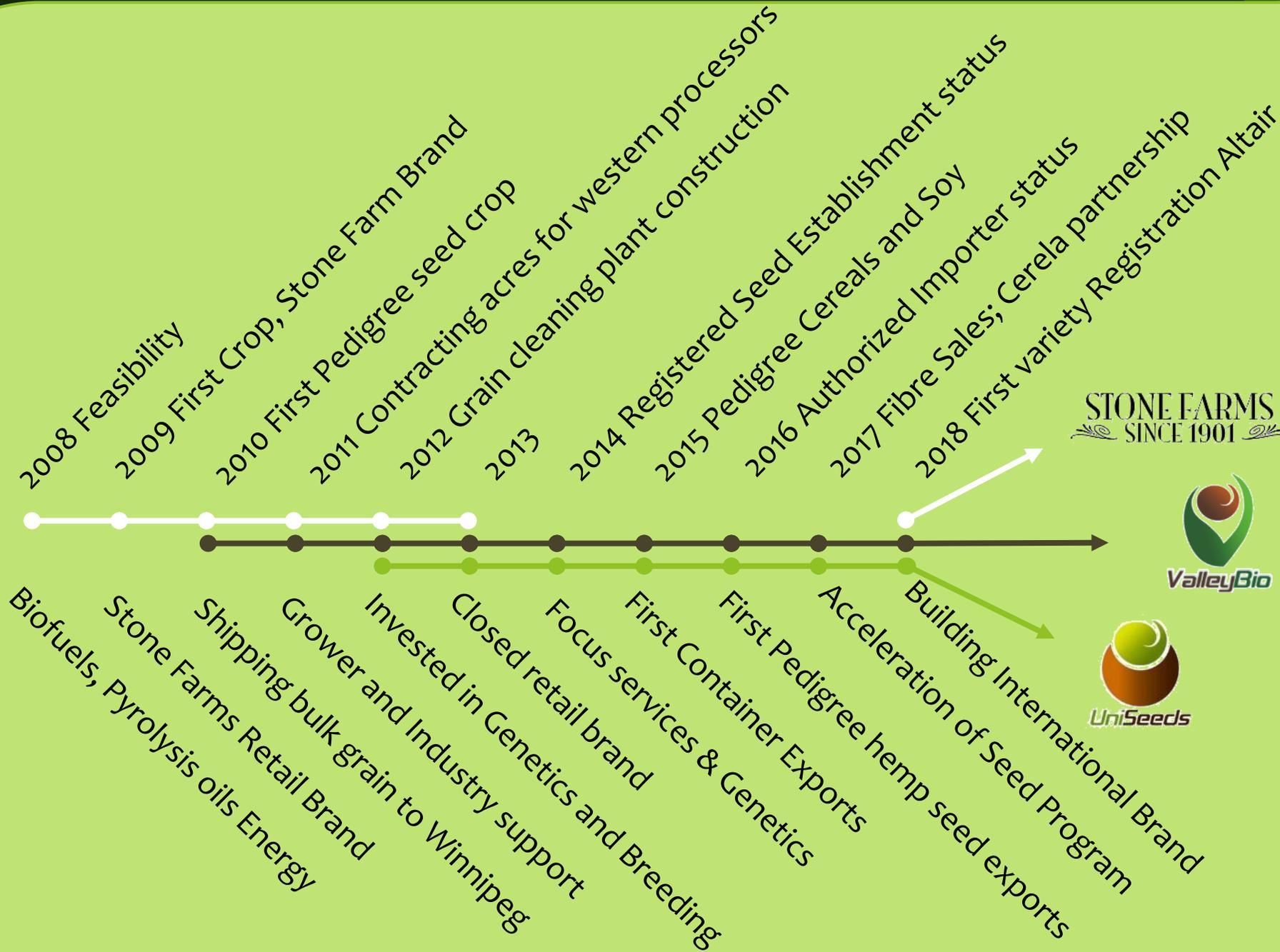
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- Hemp Breeding program since 2012
- First New Varieties available 2019



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# 10 YEARS IN





# Canadian Hemp Production

## PRODUCTION PERMITS IN CANADA



# What do you need to know to GROW industrial hemp?



# Industrial Hemp Production Calendar



CROP MANAGEMENT												
	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
Scouting	TAKE SOIL SAMPLES					WEEDS, INSECTS	STAND COUNT	DISEASE, INSECTS	THC			
						SOIL NIRATE	TISSUE					
Crop Development						EMERGENCE		FLOWERING, SEED SET				
Fertilizer	P, K APPLICATION					N, P, K, S APPLICATION	SEED PLACED	N, S APPLICATION	FOLIAR			
Planting/Harvesting						PLANT FIBRE	PLANT SEED			GRAIN HARVEST		
										FIBRE HARVEST		
Pest Control						BURNDOWN, P.P.I		SPRAY FOLIAR				
Herbicides	PRE PLANT INCORPORATION							INSECTICIDES				
Insecticides												
Fungicides						SEED TREATMENTS NOT REGISTERED						

# Hemp Genetic Variations



Hemp is a genetically diverse and variable crop that produces raw products in three distinct categories: seed/oil, fiber, and metabolites (cannabinoids, etc.)

# Hemp Plant Types



- ▶ Monoecious: both male and female flowers are found on the same plant
- ▶ Dioecious: Separate male and female flowering plants

# Planting - Site Selection

Jan - Mar



- ▶ Choose well managed, good productivity cash crop land, dryland or irrigated

- ▶ Know your:

- ▶ Crop History
- ▶ Soil structure and type
- ▶ Weed loads - control strategy
- ▶ Fertility levels - Soil test

- ▶ Hemp will grow on a variety of soil types
- ▶ Hemp will do best on soil with good fertility and drainage

## Sandy Soil

- ▶ Lets the taproot seek moisture/nutrients from deep in the soil

## Clay Soil

- ▶ Does not have quality drainage
- ▶ Impaired drainage can stunt growth

# Planting - Planning

May - Jun



- ▶ Seeding rates: 15-30 lb/ac
- ▶ Higher seeding rates = closer together growth, less branching, self thinning
- ▶ Planting depth: 0.5"-1.5"
- ▶ Planting dates: May-15-June 30 , 120 days



# Planting - Equipment

- ▶ Conventional or no-till seed drill
- ▶ Corn seeder
- ▶ Air seeder
- ▶ Calibrate equipment to handle seed gently



# Planting - Stand Count

1-2 weeks post plant



- ▶ Scout and check stand establishment
- ▶ Grain Minimum Stand 80,000 plants/acre
- ▶ Grain Optimum Stand 175 - 250k plants/acre
- ▶ Fibre Minimum Stand 150k plants per acre
- ▶ Fibre Optimum Stand -- it depends
- ▶ CBD Minimum Stand -- it depends



# Crop Management - Nutrients

- ▶ Hemp is a heavy nutrient feeder
- ▶ It responds well to nitrogen, phosphorus, potassium and sulphur
- ▶ Soil testing is suggested to determine optimal soil amendments required



# 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

# Example Nutrient Application

- ▶ Pre-plant broadcast - keep N low, adding S
- ▶ Seed placed at time of planting - split N application
- ▶ Foliar application post tissue test - 3-4 weeks post planting

Nutrients Applied  
68-34-78-15



PASS # - 2



Tank 1 - Liquid	Seed Placed	6-24-6-0
Avg Rate: 5 gal/ac		Total Product: 95 gal
19.0 ac	5 gal/ac	3-12-3-0 <input type="checkbox"/>



PASS # - 1



Tank 1 - Dry	Broadcast	5-10-35-4
Avg Rate: 210 lb/ac		Total Product: 3,990 lb
19.0 ac	210 lb/ac	13-22-75-9 <input type="checkbox"/>



PASS # - 4



Tank 1 - Liquid	Dribble Band	29-0-0-3
Avg Rate: 16 gal/ac		Total Product: 304 gal
19.0 ac	16.00 gal/ac	52-0-0-6 <input type="checkbox"/>





22gal/ac UAN-32 +S



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# Rotation

- ▶ Hemp fits well into typical rotations (3-4 years)
- ▶ Rotating with legumes and cereals works well
- ▶ Legumes deposit nitrogen which the hemp can then use the following year
- ▶ Watch for white mold carryover
- ▶ Cereals can help mitigate white mold risk



# Weed Control



- ▶ Hemp is sensitive to residuals
- ▶ Ensure ground is free of chemical residues
- ▶ Conventional practice: glyphosate burn down pre-plant, very few registered weed control options
- ▶ Organic options: tillage, intercropping, row cultivation, heavier seeding rates
- ▶ In general, in-season chemical weed control needs should be low if planting conditions are good



# Hemp Diseases

- ▶ White Mold
- ▶ Grey Mold
- ▶ Fusarium Crown/Foot/Root Rot
- ▶ Powdery Mildew
- ▶ Novel Leaf Spot
- ▶ etc.



# Pests - Insects

- ▶ Cut worms, Seed maggots
- ▶ Aphids, Thrips
- ▶ Corn Flea Beetle
- ▶ Corn/Hemp Borer
- ▶ Japanese/lady beetles
- ▶ Stink bugs
- ▶ Grasshoppers, Leafhoppers
- ▶ etc.



# Pest Control

- ▶ To date, no insects have been voracious enough to require control
- ▶ No insecticides registered for hemp
- ▶ Other field pests can include deer, birds, spiders, etc.
- ▶ Post harvest pests can include: flour beetles, spider mites, Indian meal moths and rodents



## Pest Control

- Assure2 - On label
  - Bromoxynil 16-028
  - Ethafluralin On label
  - Boscalid 11-009
  - Matador 12-035
  - Warrior 12-036
- Need more equivalency  
with other cannabis PCP

## New Priorities

- Insects: Corogen
- Soil Disease: EverGol, Root Shield, T22
- White Mould: Serenade, Priaxor, Acapela, Proline
- Broadleaf: Command, Everest, Chateau, Zidua



# Grower Resources



[www.uniseeds.ca](http://www.uniseeds.ca)

[www.hemptrade.ca/eguide](http://www.hemptrade.ca/eguide)

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

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

<https://norquest.ca/home.aspx>



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THANK YOU

Questions?