

Industrial hemp 101: What is hemp and why hemp?

Jan J. Slaski Ph.D., P.Ag. (Dist.)
Vegreville

St. Paul - March 30, 2017
Whitecourt - April 4, 2017

What is hemp?

- Hemp is one of the oldest fibre and food crops
- Originates from Central Asia where it was cultivated 6,500 years ago
- The Greek name of hemp, κάνναβις (kannabis), means “fragrant cane” - aroma is produced by volatile compounds (primarily terpenes)



Taxonomy of hemp

- Hemp (*Cannabis sativa* L.) has two subspecies: *sativa* and *indica* that differ in content of delta-9-tetrahydrocannabinol (THC)



Industrial hemp < 0.3%

Marijuana up to 40%

Flower structure

Hemp plants can either be:

- **male** – staminate flowers (pollen sacks)
- **female** – pistillate flowers (ovary)
- **hermaphroditic** - male and female

Hemp cultivars can be:

- **Dioecious** – separate male and female plants
- **Monoecious** - hermaphroditic



Cultivar selection

Monoecious vs dioecious

Potential yield of fibre and seeds depends on cultivar type



As much as 40% male plants



Less than 1% male plants

Usage types



Grain type

- Short stature
- High seed yield
- Low vegetative biomass

Fibre (dual) type

- Tall or very tall plants
- Very high stem yield
- Lower seed yields

Hemp is a multipurpose crop



Every single part of the plant can be used

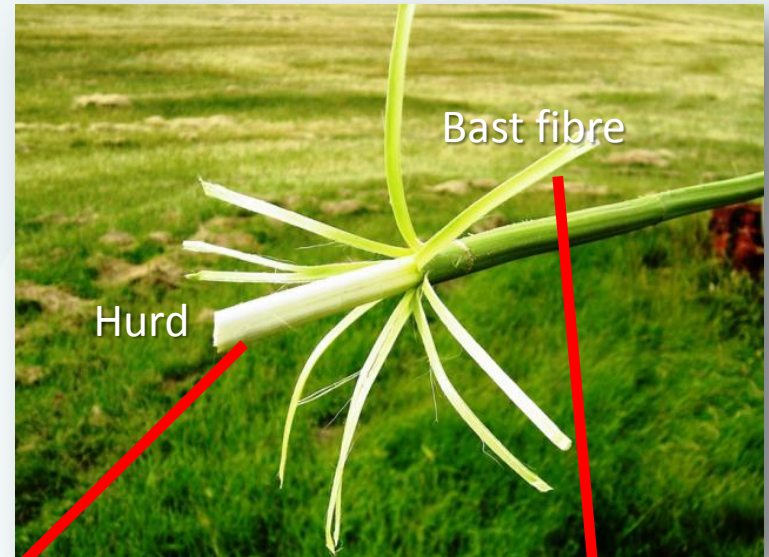
Flowers, seeds,
(and leaves)

Stem

Grain and fibre applications



- Food products (protein, oil, nuts)
- Cosmetics
- Paints, varnish
- Lubricants
- Biodiesel
- Bioplastics



- Biobuilding materials
- Industrial absorbents
- Insulation
- Animal bedding
- Garden mulch
- Low-grade paper
- Fibreboard
- Biofuels
- Chemicals
- Biocomposites
- Textiles
- Geotextiles
- Rope and twine
- Carpeting, upholstery
- Paper products
- Fibreboard

Chaff (leaves, flowers, bracs, etc.) applications



- In addition to THC hemp contains in flowers/leaves 0.5 to 2% of cannabidiol (CBD), a compound without psychoactive attributes
- Medical applications of CBD:
controls pain, schizophrenia, treats Crohn's disease, multiple sclerosis, epilepsy in children and infants, rheumatoid arthritis, colitis, liver inflammation, heart disease, diabetes, reduces the size of some cancerous tumours.



Hemp is one of the faster growing plants

July 14



July 19



Growth rate - 15 cm per day; up to 5 m

Northern advantage

- Hemp is a short day plant – long days (17 h) at higher latitudes delay flowering
- Stem elongation occurs before flowering
- “Northern advantage” of fibre production



History of hemp in Canada

- **Arrived in Canada in 1606, became popular 1801**
Seeds distributed for free - used for clothes, ropes, paper, oil
- **Collapse of a long lasting career**
 - **19th century** – new plants (cotton, jute), wood processed into paper pulp
 - **1938 – 80's** – synthetic fibres, psychoactive compounds
- **Revival**

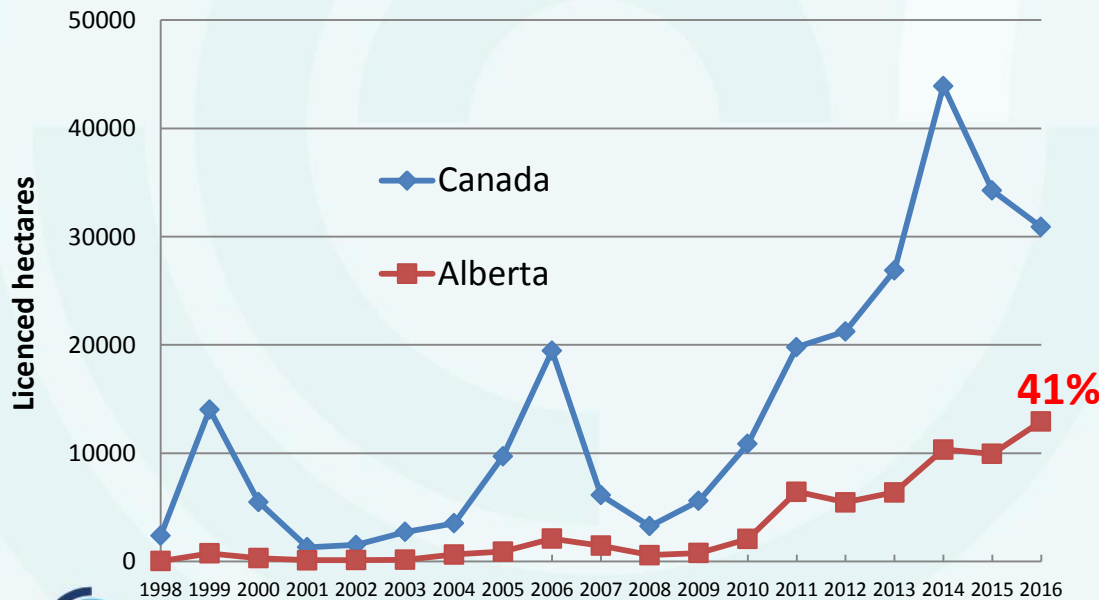
In 1998 it became legal to grow **industrial hemp (less than 0.3% THC)** in Canada as a sixty year ban was lifted.



- **Information gap**
 - old, labor intensive cultivation and processing technologies
 - minuscule breeding and research programs
 - new opportunities

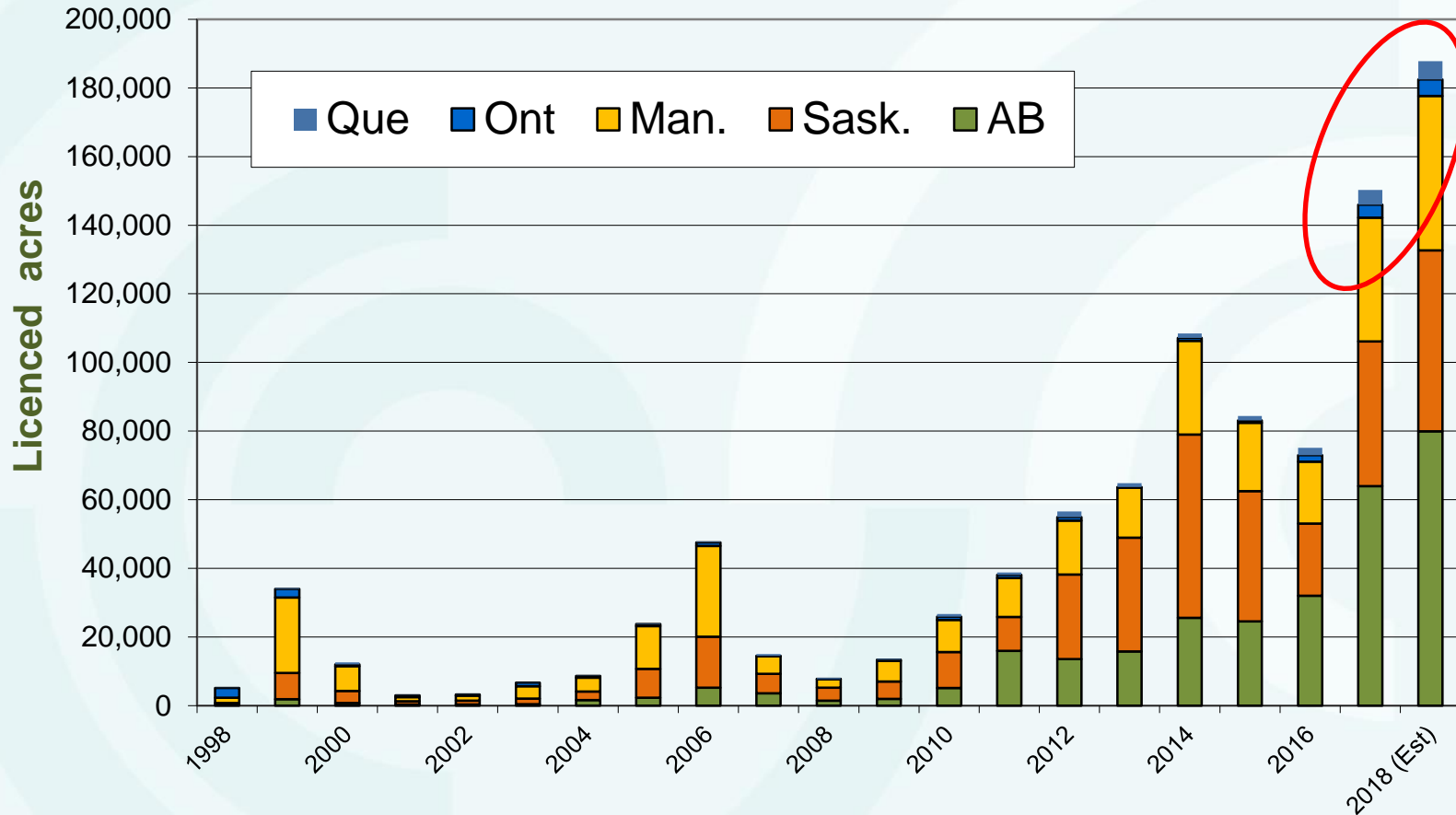
Fluctuations of hemp acres

- Hemp acreages are driven by the demands of grain processors
- High yields of conventional hemp and insufficient processing capacity led to inventory surplus



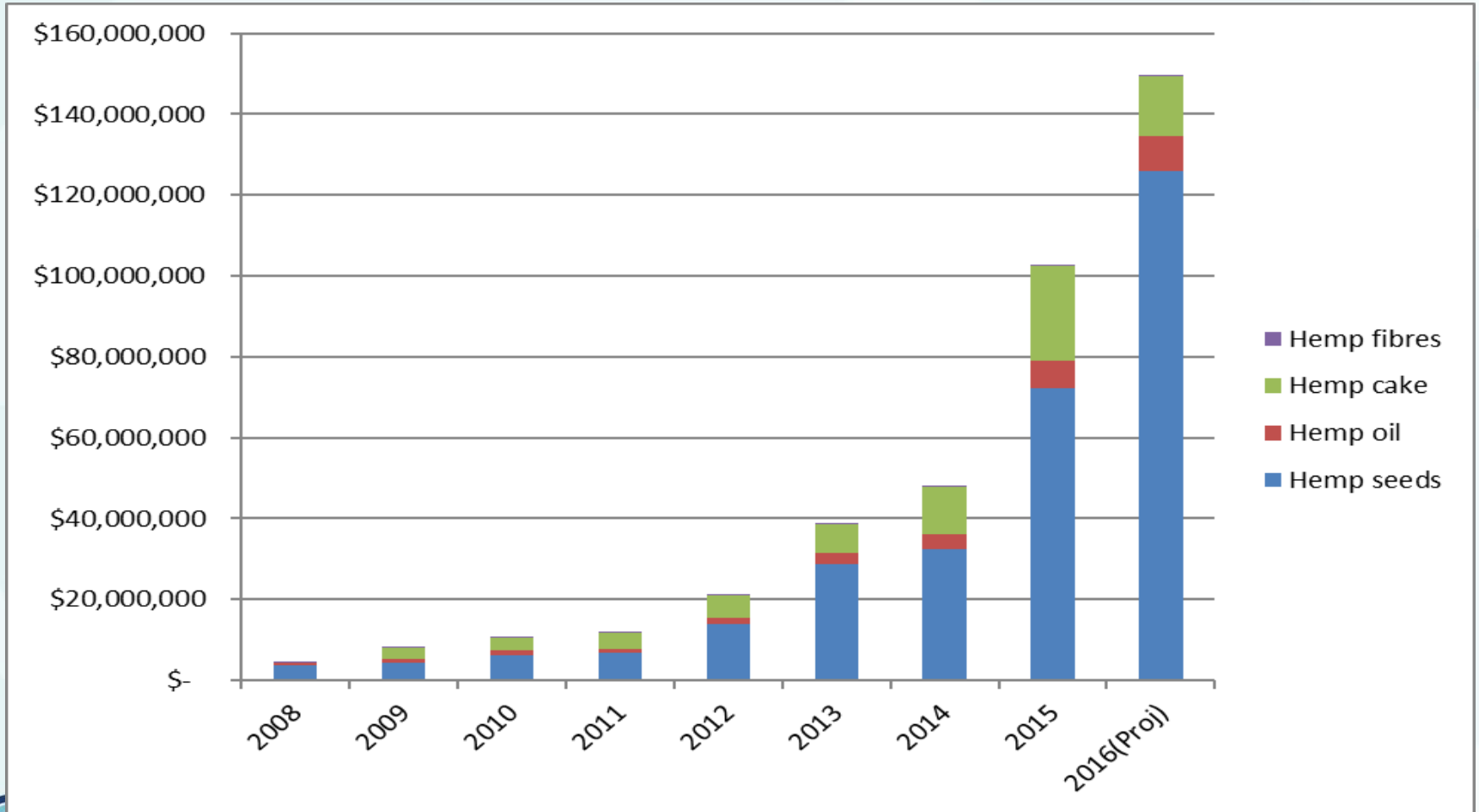
| Province | Total Licences | % of Cultivation Licences |
|--------------|----------------|---------------------------|
| AB | 325 | 67% |
| BC | 31 | 45% |
| MB | 266 | 58% |
| NB | 2 | 50% |
| NS | 8 | 63% |
| ON | 65 | 72% |
| PEI | 8 | 63% |
| QC | 127 | 65% |
| SK | 262 | 54% |
| Total | 1095 | 61% |

Hemp acres will grow again



- High demand for both conventional and organic acres in 2017 (and 2018)
- Growth in the future will be additionally fueled by demand for fibre

Export – a driver of industry growth





Thank you !