Renewable Oil Feedstocks for the Pacific Rim
with focus on
Camelina sativa (Camelina)
and Brassica carinata (Carinata)

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Mike Cey (P.Ag.)
Director of Corporate Initiatives
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Ag-West Bio Inc.
Saskatoon, SK, Canada
Saskatchewan Agriculture – Overview (2013)

- Total Farm Land Area: 61.53 Million Acres (24.9 M Ha)
- Cultivated Farm Land Area: 44.97 Million Acres (18.2 M Ha)
- Natural Land for Pasture: 11.86 Million Acres (4.8 M Ha)
- Chem-fallow area: 3.46 Million Acres (1.4 M Ha)
- Climate Normals:
  - Annual Precipitation: 326 mm to 451 mm rainfall
  - Frost free period: 95 days to 124 days
- Number of Farms: 36,952
  - Grain and Oilseed farms: 22,195
- Average Farm Size
  - Total Area: 1668 acres (675 Ha)
  - Cultivated Area: 1218 acres (493 Ha)
Saskatchewan – Oilseed Crop Share

• Canola:
  – Canada produces 30% of global production
  – Saskatchewan produces 50% of Canadian crop

• Flax:
  – Historically, Canada produced 45% of global flax seed
  – Saskatchewan produces >70% of Canadian crop

• Mustard:
  – Saskatchewan produces >75% of Canadian crop
  – Major exporter of mustard in the World
Saskatchewan Oilseed Portfolio

- **Oilseed Crops for food:**
  - Canola
  - Flax
  - Mustard
  - Sunflower

- **Oilseed Crops for Industrial Use:**
  - HEAR
  - Flax
  - Camelina
  - Ethiopian mustard/Carinata

- **Soybeans**
Renewable Oil Feedstocks for the Pacific Rim

PRODUCTION

- *Camelina sativa* (False Flax) and *Brassica carinata* (Ethiopian Mustard) are highly suitable to Prairie growing conditions.
- Camelina thrives in all regions; carinata is especially suitable in the drier southern regions.
- Inherent capacity for hardiness and drought tolerance.
- Developed: Dedicated Industrial Oilseeds (primarily non-food use, camelina also has minor food use applications).
- Current Production: camelina 0.82 MT/ac; carinata 0.92 MT/ac, with oil content of 40+\%.
- Newer varieties under development: Over 1.00 MT/ac. with >45\% oil content.
Camelina Production Advantage
Factors for success

• An excellent Industrial Platform Crop
• Proven to fit our climate and agriculture systems
• New crop option for Saskatchewan Producers
• Low input cost ($60-$70/acre), non-shattering pods (no swather), heat and drought resistant (West Central in 2009)
• Fall Seeding possible (unique for an oilseed crop)
• Blackleg and flea beetles are not a concern
• We can grow it well
Camelina – Achievements

• Agronomy Package developed.
• Grower meeting held – First in Canada (Nov ‘09).
• ADOPT trials conducted across the Province (2009-11)
• Agronomics Factsheet published for growers (2011)
• Developed Crop Insurance package – first in North America (2010)
• Assure II and Roundup WeatherMaxx registered through Minor Use program (2010-11)
Carinata Production Advantage
Carinata Advantage

- Mustard 21 (SaskMustard) is developing Ethiopian mustard as an industrial oilseed crop in Saskatchewan.
- Saskatchewan Agriculture (ADF) and Western Economic Partnership Agreement (WEPA) have already made significant financial contribution to this crop.
- Canadian and Saskatchewan biofuel mandates will create demand.
- Production of oilseed crops must be expanded to other non-traditional areas of Saskatchewan.
- Carinata is already adapted to the more arid regions of SK.
Factors for Success

• First Canadian Industrial Oilseed Crop to Receive RSB certification – December 2013.

• Crop oil targeted for biodiesel, bio-lubricant and jet fuel markets and meal targeted for biopesticide and livestock market.

• Agronomy work already done by AAFC.

• Targeted to brown and dark-brown soil zones.

• Cropping area and Industrial products are different from that of camelina crop
Carinata, a Unique Industrial Oilseed Mustard

- Canola and soybean oils are predominantly C18 fatty acids
- Carinata oil is predominantly C22 fatty acids, meaning more carbon in the oil
- Provides an excellent feedstock for advanced catalytic biojet and biodiesel processes
- Carinata seed is very high in oil content (>40%)
Metabolix Crop Businesses

*Industrial Oilseed and Biomass*

**Biopolymers**
- Genetically modify crops to produce polyhydroxybutyrate (PHB) polymer directly in seeds or leaves
  - Low cost pathway to plastics, chemicals, and fuels
  - Numerous commercialization options

- ![Image of biopolymers](image)

**Yield Traits**
- Develop methods to increase carbon capture in oilseed and biomass crops
  - Increase plant yield and carbon deposition to products

- ![Image of yield traits](image)

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**Oilseeds (Near Term Target)**
- **Target crop:** *Camelina sativa*
- Industrial oilseed with low required inputs

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**Biomass (Longer Term)**
- **Target crops:** Switchgrass/Sugarcane
- High density energy crops
LINNAEUS PLANT SCIENCES INC.
Increased MUFA From 30% to 80% in collaboration with DuPont Pioneer since 2010
This is the first and only non-food High Oleic oilseed
$1/lb not $0.50
High Oleic, High MUFA and Hydroxy Fatty Acid crops

*In Field Trials in less than two years ...*
Thank you
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Mike Cey (P.Ag.)
Director of Corporate Initiatives
Ag-West Bio Inc.
Tel: 306-668-2654
Cell: 306-371-0265
mike.cey@agwest.sk.ca

www.agwest.sk.ca