

A layman's guide to mustard breeding

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MUSTARD HYBRID PRODUCTION

- M21 Program Goals
- What, Why, How and Where of Hybrids?
- Certified Hybrid Mustard seed production

M21 – 2009 mandates

- 2009: M21 Top Three R/D Priorities- Increase Mustard Yields: Manage Weeds, develop non condiment opportunities.
- YIELD was #1
- Focus: establish a long-term sustainable breeding program
- Boost returns per acre to compete with cropping alternatives
- Maintain Canadian mustard – quality and supply
- Maintain Canadian share of the Global markets

Yield comparisons Brown Soil Zone Sask.

	Yellow	Oriental	Brown	Canola
bu/ac	14	17	16	33
lb/ac	715	855	815	1650

source: Crop
Planning Guide
2016

The Canola hybrid story

- Hybrid vigor (Heterosis) >Yield
- Quicker germination
- Faster canopy closure
- More competitive against weeds
- Greater volume and deeper root mass
- Responsive to higher levels of fertility

Hybrid Tool-kit

- One way: plants without pollen (females) & Plants with pollen (males)
- Second way: Mustards own outcrossing mechanisms
- Canola Hybrid systems: Polima, Ogura, MSLembke, Liberty Link, SI

Mustard Breakthrough Tools

- Example: Ogura cytoplasmic male sterile in Brassica juncea (Oriental and Brown Mustard)
- -A line
- -B line
- -R line (AAFC breakthrough with minimal linkage drag)



Photo Credit: Scott
Horner, HYTECH



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Horner, HYTECH

What makes hybrid yield? DNA has two strands

- OP variety

010101010101011
100100010010100

- Isolated Parent I

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- Isolated Parent II

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How “Mustard Hybrid Certified seed” is produced

- Flow through system
- Greenhouse/isolation cage
- Field isolation tent



How “Mustard Hybrid Certified seed” is produced

- Field scale multiplication parents
- Field scale certified seed production

What it takes to build commercial certified seed from where we are today

- Summer – yield trials multiple hybrids
- Winter – multiply parent seed lines
- Summer – Breeder plots parents
- Summer – First certified seed fields





Photo Credit: Scott
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Challenges in production

- Numbers: What to throw away? Good yield trials
- What to fast-track?
- Cannot afford to multiply parent lines for all combinations
- How do we shorten the time line?

Using Contra season - Chile to help fast track

- Produce experimental hybrid seed for first yield trials
- Multiply small amounts of parent seed to kg quantities
- Kgs are sufficient for field scale plots in Canada
- Much more cost efficient than greenhouse and growth rooms

Cost of Hybrid seed production depends on

- Yield of parent lines
- Hybrid seed from these parent lines under field conditions
- Establishing a Certified seed production program
- Finally launch - Hybrid seed – takes meticulous planning; time to generate CS; inventory etc.



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Horner, HYTECH

Planting of Mustard Hybrid has to be a viable
business proposition the whole Mustard

Value Chain:

grower,

processor and

the consumer packager

Thank You

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