MonolaTM Oil: High stability canola oil in Australia

Nuseed Cultivars for HOLL Markets

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Canola oil

- Canola = oilseed success story
 - 'healthiest' salad/domestic cooking oil
- Good dietary oil, Good balance of FAs
- Market leader for omega-3 FA's (12% C18:3)
- Market leader Retail Sector (spreads, bottles)



Why Canola oils are Not Good Frying Oils?

- High level C18:3 (12%) causes instability of the oil
 - 1. Breakdown products unpleasant
 - breakdown leads to "fishy" odours
 - & reduced sensory properties
 - 2. Reduction of shelf life of oil and end products (fries, potato chips, snacks)
- At 1.6m MT of grain @ 40% oil represents 70% of domestic production of vegetable oils
- Usage of 120KT oil represents some 25% total domestic usage (~450kt oils & fats)



How to Get Stable Frying Oils

- Change fatty acid composition in oils
 - 1. Hydrogenation

Problems

- Saturated fat, Trans Fatty acids,
- Hydrogenation Flavour (waxy, fruity, paraffin)

2. Plant-breeding

- Dietary benefits of products (reduced saturates)
- High Oxidative Stability



Plant Breeding Solution to get stable frying canola oils

- Increase the level of oleic acid (C18:1)
- Lower level of linolenic acid (C18:3)

Expand opportunities for usage for canola oils

- An import replacement for palm and animal fats ~200Kt oil
- 1. Oils that are solid when cold, after use=removal problem
- Don't fit the image of "Healthy Oils & Fats"
- Stable oils=Positive dietary benefits & domestic economy



Recommendations for Fatty Acid Compositions for Stable Frying Oils

According to USDA studies by group headed by Dr Kathleen Warner

- 5-7% saturates (C16:0 + C18:0)
- 63-73 % oleic C18:1
- 15-22% linoleic C18:2 (enhances sensory properties)
- <=3% (3.5%, 4%) linolenic C18:3 (essential for frying stability)</p>
- A (=<) 6:1 ratio of polyunsaturates (Linoleic: Linolenic) optimal for dietary intakes of products (reduced saturates)
- No real benefit of higher oleic levels



MonolaTM Oil



- Specialty Canola developed by Nuseed
 - FA composition of canola modified by normal plant breeding
- Greatly enhanced stability vs. Canola Oil
- Exciting extension of Canola for Aust.
- Sensory properties (taste, flavour, odour)
 - good deep fried flavour in Food
 - No off flavours
- No need for hydrogenation



Market and Industry Perspectives for Specialty Canola

Oil Type	Saturated Fatty Acids	Monounsaturated	Polyunsaturated	
	Palmitic + Stearic	Oleic	Linoleic	Linolenic
	C16:0 + C18:0	C18:1	C18:2	C18:3
Canola Oil	7-8%	60% (57-62%)	20%	12%
Monola [™] Oil	6-7%	70% (67-71%)	20% (17-22%)	2.9% (2.2-3.5%)
Olive Oil	16-24%	70-77%	6-8%	
Palm Olein	50%	45%	4%	



Development of MonolaTM cultivars



- > 14 years to develop cultivars
 - Grain yields (95-100%)
 - Blackleg disease resistance & agronomic traits similar to canola
- Extensive laboratory analyses:
 - GC & NIR
- Fatty acid profiles suitable for diverse markets
- Herbicide resistance a key priority
 - **Eg. Triazine-Tolerant**

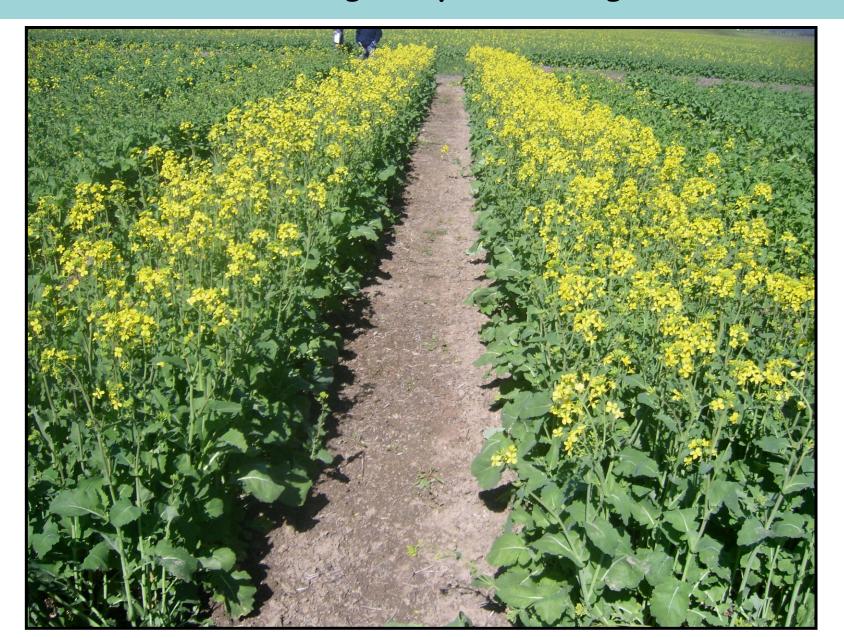
Wherever Canola is Grown, so can Monola

Lines are evaluated for disease resistance



Source: Steve Marcroft (MGP, 2004)

Lines are evaluated for grain yield and agronomic traits



Extensive Laboratory analyses: oil, protein, glucosinolates & fatty acids



Current MonolaTM Cultivars: MonolaTM 77TT

A Triazine herbicide-tolerant HOLL cultivar

- First across-the board cultivar
- Suitable for production in the major canola regions



Maturity: Medium

Blackleg Res.: MR

Oil%: Bravo TT+2%

FA profile: Excellent

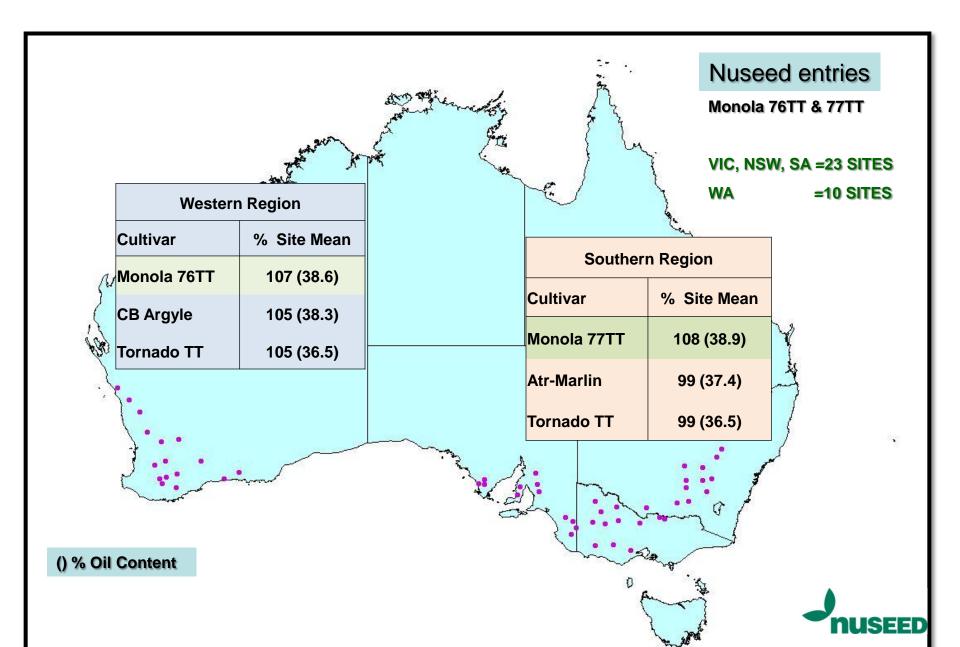
C18:1=69-71%

C18:3=2.7-3.3%

Yield: ~100% Bravo TT

(2008 NVT)

2008 National Variety Testing (NVT) Trials



Specialty breeding programs: Needs?

C18:3 content = f (Cultivar, Temperature, Rainfall)

Temperature

- Post-flowering high temperatures hasten crop maturity
- At high temperatures-less PUFAs
- C18:3 decreases during exposure to high temp. during seed-filling.

Target Population of Environments:

Established "more reliable" production regions

- particularly the better rainfall regions,
- less prone to severe frosts during seed-fill
- regions produce the higher oil content &
- most consistent fatty acid profiles

Monola cultivars for reliability of yield & stability of FA profiles



Summary-Specialty Canola

- MonolaTM TT cultivars: Excellent performance in NVT trials
 - Grower awareness and acceptance
- SPEC canola = Major extension of Canola Opportunities
- Main focus=Frying applications
 - potential market > 130kt oil

