Canola Review 2006

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Latest information

- 16 new varieties/hybrids will be marketed in 2006.
- Limited yield results are available to date – check NVT database and produce summaries for your areas.
- Review long term data and try new varieties in conjunction with proven varieties.
- Biodiesel is a renewable fuel that reduces greenhouse gas emissions and has the potential to offer grain growers an alternative market for their oil-based grains.
- GM crops have had significant global economic and environmental impact but have been effectively on-hold in the short term in Australia due to the moratoriums imposed by state governments.
- If Australian canola growers are to remain competitive in export markets, they will need access to new GM varieties. Many of the genetic improvements in canola in the foreseeable future will result from the use of molecular technologies.
- Canola quality *Brassica juncea* "JUNCEA CANOLA" has been developed for growers in low rainfall areas of Australia. Commercial production is expected to commence in 2007.

New Varieties for 2006

Sixteen new varieties (listed below) will be marketed in 2006. These comprise six new conventional, two clearfield, four triazine tolerant and four specialty varieties. All varieties being marketed in Victoria and SA are listed in tables 1-4.

Conventionals

- ^{AV}Opal – (Breeders code RR002), early maturing, good blackleg resistance (7.5P), bred by DPI Victoria and marketed by Dovuro Seeds.
- Hyola45 – (Breeders code H4481), early maturing hybrid, good blackleg resistance (7.0P), bred and marketed by Pacific Seeds.
- Pioneer®44Y06 - (Breeders code 02N708C), early maturing hybrid, very good blackleg resistance (company rating 7.0P), bred and marketed by Pioneer Hybrid.
- ^{AV}Jade - (Breeders code RR013), early-mid maturing, very good blackleg resistance (8.0P), bred by DPI Victoria and marketed by Dovuro Seeds.
- ^{AV}Ruby - (Breeders code RQ011), mid maturing, very good blackleg resistance (8.0P), bred by DPI Victoria and marketed by Dovuro Seeds.
- Hyola75 – (Breeders code CBI4407), mid-late maturing hybrid, very good blackleg resistance (8.5P), bred by Canola Breeders International, marketed by Pacific Seeds.

Clearfields

- Pioneer®45Y77 - (Breeders code 03N734I), early maturing Clearfield hybrid, very good blackleg resistance (8.5P), bred and marketed by Pioneer Hybrid
- WarriorCL - (Breeders code BLN2867CL), early-mid maturing Clearfield, blackleg resistance (7.0P), bred by DPI NSW and marketed by Plant Tech.

Triazines

- ATRBanjo – (Breeders code AGT346), early triazine tolerant cultivar, good blackleg resistance (7.0P), developed by Ag-Seed Research and marketed by Nufarm.
- Boomer – (Breeders code CBTT-026), early triazine tolerant cultivar, good blackleg resistance (6.5P), developed by CBWA and marketed by Grain Trust, with and End Point Royalty.
- BravoTT – (Breeders code BLN2893TT), early-mid triazine tolerant cultivar, very good blackleg resistance (7.5P), developed by NSW DPI and marketed by Plant Tech.
- ATRSummitt – (Breeders code TP004), mid triazine tolerant cultivar, good blackleg resistance (6.5), developed by Vic DPI and marketed by Dovuro Seeds.

High Oleic Low Linolenic Specialties

- NMC130 – Conventional HOLL cultivar, good blackleg resistance, developed and marketed by Nutrihealth.
- NMT311 – Triazine tolerant HOLL cultivar, moderate blackleg resistance, developed and marketed by Nutrihealth.
- Clear Valley 100 – Conventional HOLL cultivar, moderate blackleg resistance, developed by DPI-Victoria and Cargill and marketed by Cargill.
- Clear Valley 101 – Conventional HOLL cultivar, moderate-good blackleg resistance, developed by DPI-Victoria and Cargill and marketed by Cargill.

Variety Selection

The main features to look at when selecting a canola variety are maturity, yield, oil content, blackleg resistance, agronomic characters (early vigour and height), economics and the weed spectrum of the paddock where you are aiming to grow the variety. The maturity of varieties relative to each other can vary between locations, years and sowing times.

Choosing a new variety:

- Match rainfall and growing season length to maturity of variety required (ie. early or mid).
- Determine weed spectrum to make a decision on conventional compared with TT or IT varieties.
- Determine the level of blackleg resistance required - a high level of resistance is preferred in mid to long season areas. Varieties reliant on *sylvestris* resistance are not recommended.
- Consider the economics of different packages.

Try new varieties in conjunction with proven varieties on smaller areas.

Table 1: **Conventional canola varieties 2006**

Variety	**Year of release**	*Type*	**Maturity**	**Blackleg resistance**		**Oil[3]**	**Protein**
				Type[1]	**Rating[2]**		
[AG]Outback	2001	OP	Early	Poly	5.5	Moderate	Moderate
[AV]Opal	2006	OP	Early	Poly	7.5P	Moderate/High	Moderate
Hyola45	2006	Hybrid	Early	Poly	7.0P	Not available	Not available
Kimberley	2004	OP	Early	Poly	6.5	Moderate/High	Moderate
Pioneer®44Y06	2006	Hybrid	Early	Poly/Syl	Not available	Moderate/High	Moderate
Pioneer®44C11	2004	OP	Early-mid	Poly	6.0	Moderate	Moderate
[AG]Comet	2005	OP	Early-mid	Poly	7.5	Moderate	Moderate
[AG]Spectrum	2004	OP	Early-mid	Poly	6.5	High	High
[AV]Jade	2006	OP	Early-mid	Poly	8.0P	Very High	High
Pioneer®45C05	2003	OP	Early-mid	Poly	7.0	Moderate	Moderate
Rivette	2002	OP	Early-mid	Poly	5.0	High	High
[AG]Drover	2004	OP	Mid	Poly	7.5P	Very High	High
[AV]Sapphire	2003	OP	Mid	Poly	7.0	Very High	High
[AV]Ruby	2006	OP	Mid	Poly	8.0P	Very High	High
Hyola 61	2004	Hybrid	Mid	Poly	7.0	High	High
Lantern	2002	OP	Mid	Poly	6.0	Very High	High
Pioneer®46C04	2003	OP	Mid	Poly	7.0	Moderate	Moderate
Skipton	2004	OP	Mid	Poly	7.0	Very High	High
Hyola75	2006	Hybrid	Mid-late	Poly	8.5P	High	High

Table 2: **Clearfield canola 2006**

Variety	**Year of release**	**Type**	**Maturity**	**Blackleg resistance**		**Oil[3]**	**Protein**
				Type[1]	**Rating[2]**		
Pioneer®44C73	2001	OP	Early	Poly	5.0	Moderate	Moderate
Pioneer®45Y77	2006	Hybrid	Early-mid	Poly	8.5P	Not available	Not available
Pioneer®45C75	2001	OP	Early-mid	Poly	5.5	Moderate	High
Warrior CL	2006	OP	Mid	Poly	7.0P	Very High	Moderate
Pioneer® 46C76	2004	OP	Mid-late	Poly	6.5	Moderate	Moderate
Rocket-CL	2005	OP	Mid-late	Poly/Syl	8.0 P	Not available	Not available

Table 3: **Triazine tolerant canola 2006**

Variety	**Year of release**	**Type**	**Maturity**	**Blackleg resistance**		**Oil[3]**	**Protein**
				Type[1]	**Rating[2]**		
ATRBanjo	2006	OP	Early	Poly	7.0P	High	High
ATRStubby	2004	OP	Early	Poly	5.5	Moderate	Moderate
Boomer	2006	OP	Early	Poly	6.5P	Not available	Not available
Trilogy	2005	OP	Early	Poly/Syl	7.0	Moderate	Moderate
Trigold	2005	OP	Early	Poly	4.5	High	High
ATRBeacon	2002	OP	Early-mid	Poly	6.0	High	High
ATRHyden	2001	OP	Early-mid	Poly	6.5	Moderate	Moderate
Bravo TT	2005	OP	Early-mid	Poly	7.5 P	High	High
Tornado TT	2004	OP	Early-mid	Poly	7.5	High	Moderate
ATRSummitt	2006	OP	Mid	Poly	6.5P	High	High
Thunder TT	2005	OP	Mid	Poly	7.5 P	Not available	Not available
ATRGrace	2001	OP	Mid-late	Poly	6.0	High	High

Table 4: **Specialty canola 2006**

Variety	**Year of release**	**Type**	**Maturity**	**Blackleg resistance**		**Oil[3]**	**Protein**
				Type[1]	**Rating[2]**		
Clear Valley 100	2006	OP	Mid	Poly	Not available	Moderate	Moderate
Clear Valley 101	2006	OP	Mid	Poly	Not available	Moderate	Moderate
MC201	2004	OP	Mid-late	Poly	6.0	Moderate	Moderate
MC202	2004	OP	Mid-late	Poly	6.5	Moderate	Moderate
NMC130	2006	OP	Mid	Poly	Not available	Not available	Not available
NMT311	2006	OP, TT	Mid	Poly	Not available	Not available	Not available

1. Poly = polygenic resistance, Syl = has major gene resistance derived from *Brassica sylvestris*

2. 2005 blackleg ratings using data from 2002-2004. The official ratings for 2006 will be published by the Canola Association of Australia (CAA), and can be viewed on the CAA website http://www.canolaaustralia.com The ratings are determined from nurseries conducted around Australia by Departments of Agriculture and private breeding companies. Results statistically analysed. Varieties with insufficient data are marked P for provisional. Farmers should consult the most recent ratings as soon as they are available.

3. Oil content of varieties can vary considerably due to environmental conditions, from year to year and from site to site within a year.

Biodiesel

Biodiesel is the name of ester-based oxygenated fuels commonly manufactured from vegetable oils (i.e. canola, sunflower etc), animal fats and tallow. Dr Rudolf Diesel first developed the "Diesel Engine" to run on vegetable oil in 1895 and he demonstrated the engine in 1900 using peanut oil at a World Exhibition in Paris.

Globally there are over fifty different vehicle manufactures that honour warranties for the use of biodiesel in their engines, with over two million registered vehicles in Europe. In the United States there are over four hundred registered fleets (up to one thousand vehicles per fleet – eg. US postal service) using biodiesel. In Australia currently there are a few small-scale biodiesel plants, with approximately 8 large-scale plants for commercial scale production being proposed or built by companies. This includes one plant in Adelaide, S.A.

In South Australia, SARDI are developing mustard and canola lines for use in production of biodiesel. These selections are being taken from DPI Victoria germplasm.

In Victoria, Steven Hobbs from Kaniva has built a small biodiesel plant on his farm and uses his own oil grown from canola and mustard (*Brassica juncea)*, currently producing approximately 30% of his fuel requirements. He has plans to commission a new plant this year which will be capable of producing up to 300,000 litres of fuel annually and has a vision of decentralised

energy facilities being established where towns generate their own energy requirements through cooperative type arrangements (Steve Hobbs, pers. comm.).

There are many issues that need addressing if the use of biodiesel is to be equitable for all users. Under our current Energy and Grants Credits Scheme legislation (EGCS), biodiesel is not eligible for agricultural production, not enabling farmers using biodiesel in an off road situation to be eligible for EGCS rebate. Whereas the same fuel used in an eligible truck in an on road situation, the farmer can receive the EGCS rebate. The economics of producing biodiesel and crop choice also need careful consideration. Other factors to be considered include the uses of meal from crushing additional oilseeds within Australia for biodiesel production. This meal will need to be used for intensive livestock rations or else other uses will have to be developed. Other issues include the logistics of regional crushing and use of oil and meal.

GM Breeding and release - Update

Current Status

Internationally, 2005 represented the tenth planting season since GM crops were first grown. The global area of GM crops increased around 50-fold between 1996 and 2004, reaching 81 million hectares in 17 countries in 2004. There has been significant global economic impact on farm income and environmental impacts of the technology with respect to pesticide usage in every country where GM crops have been grown. An analysis of the impact by Brookes and Barfoot has shown substantial net economic benefits at the farm level amounting to a cumulative total of $27 billion. The technology has reduced pesticide spraying by 172 million kg and reduced the environmental footprint associated with pesticide use by 14% (Brookes and Barfoot, 2005).

GM canola is still effectively on-hold in the short term in Australia due to the moratoriums imposed by state governments. These are due to end by 2008. Two GM canola products, Roundup Ready® varieties and InVigor® hybrids, were effectively ready for large scale demonstrations and commercial release when the moratoriums were imposed. Trials of these products had already shown them to be highly competitive.

In trials to date, potential Roundup Ready® varieties have demonstrated yields equivalent to conventional varieties. The yields following application of appropriate management systems were consistently higher than both conventional and TT systems (Hudson, 2002).

Results from these trials have also supported the commercial experience of growers in Canada where substantial savings on herbicides, fuel and time have significantly improved growers' gross margins and competitiveness (Hudson, 2002).

Likewise, InVigor hybrids have demonstrated significant yield advantages over open-pollinated varieties in trials throughout Australia (Pike and Clarke, 2004; Bayer, 2004).

The results highlight the potential benefits these and other new technologies offer to Australian growers. As with any new product type, additional breeding with these products in Australia would further enhance the benefits to the Australian industry. It is expected that within 5-7 years of GM canola becoming available in Australia, the majority of canola production would come from GM varieties.

Many of the genetic improvements in canola in the foreseeable future will result from the use of molecular genetic techniques to introduce new genes, modify existing ones and to provide more efficient means to identify specific combinations of genes. For production and marketing purposes, these developments can be divided into two categories, those with modified crop production traits and those with modified product quality traits. Examples of modified production traits include new sources of resistance to herbicides, insects, diseases, viruses and

stress, plus modification of crop architecture. Product quality modifications include oil content, oil quality, protein content and quality, reduced anti-nutritional components and novel constituents (including plant-based vaccines, peptides and industrial enzymes). If Australian canola growers are to remain competitive in export markets, they will need access to these new characteristics.

Juncea Canola - Update

Canola quality *Brassica juncea* has been developed for growers in low rainfall areas of Australia through the National *Brassica* Improvement Program (NBIP), in association with the Saskatchewan Wheat Pool. This crop is different to condiment mustard in quality, end-use and agronomy, and the term "juncea canola" is being used to recognise these differences. Juncea canola has low erucic acid and low glucosinolates, with oleic acid levels similar to *B. napus*. It can therefore be considered to produce a product equivalent to conventional canola produced from *B. napus*.

The advantages of *B. juncea* over *B. napus* include more vigorous seedling growth, quicker ground covering ability, greater tolerance to heat and drought and enhanced resistance to the blackleg fungus, *Leptosphaeria maculans* (Woods *et al.* 1991, Burton *et al.* 1999). *B. juncea* seed pods shatter less readily and seeds potentially contain a higher percentage of oil plus protein because the yellow seed coat is thinner. These advantages make it the preferred species for low rainfall areas of Australia and for late sowing in higher rainfall environments.

The benefits of canola quality *B. juncea* have likewise been recognised in Canada, where there are major breeding programs focused on its development. The first juncea canola cultivars were released in Canada in 2002. They yielded around 6% more than the best *B. napus* types in the short growing season areas of Alberta and Saskatchewan. In 2003, there were almost 4000 ha of juncea canola in the prairie provinces of Canada. Two new cultivars were released in 2004.

There has been steady progress in both the yield and the quality of juncea canola. Lines with all required agronomic and quality characteristics have now been identified. This includes 'zero' erucic acid in the oil, meal glucosinolate levels below the current required canola quality standard, 'zero' allyl glucosinolates (<2/micromoles/g oil-free meal), oleic acid levels comparable to *B. napus* lines such as AG-Outback and Hyola43 and mean yields and oil contents similar to *B. napus*. Based on the performance of juncea canola reported here, growers will have access to a profitable and reliable non-cereal crop in low rainfall areas, in particular where *B. napus* canola yields are less than 1.5 t/ha.

While the initial juncea canola cultivars are likely to have similar yields to early *B. napus* cultivars, production costs are expected to be significantly less. Further yield improvements are anticipated with additional breeding. The initial juncea canola cultivars will be conventional, with TT and Clearfield cultivars expected in 3-4 years.

Plans for 2006 include the harvest of summer breeder seed multiplication of four lines in Tasmania and two lines in Victoria. A series of demonstration trials using these lines to highlight the benefits of juncea canola, concurrent large scale seed increase of the best two-three lines (for commercial production in 2007) and further agronomic research. The support of all players in the canola supply chain for release in 2007 is currently being sought through the Australian Oilseeds Federation.

References

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