

GM CANOLA HAS FINALLY LANDED: TOP FLIGHT

Declining yields and profitability from Australia's third biggest broadacre crop, canola, have become significant issues. It is certainly the case on our Central Victorian farm that canola within our wheat rotation has greatly increased yields. But in recent years the cost of growing canola – combined with late seasonal breaks – has forced a reduction in our area seeded.

This is in contrast to the Canadian experience where the annual area seeded to canola is increasing – in 2007 this stood at six million hectares. Ninety five per cent of Canadian canola is non-conventional. Overwhelmingly, Canadian growers are choosing to grow GM canola.

In fact, leading Canadian farmers I talked to were very happy with the technology from both environmental (reduced chemical quantities and toxicity) and financial perspectives.

The GM technology does have a financial cost. But we need to

keep in mind that the greatest influence on canola yield is the length of growing season and moisture. So with less herbicide use – plus the yield benefits obtained from the ability to seed early and control weeds – the GM technology cost is more than covered.

A grain farmer in Saskatchewan Canada told me: "The developers of Roundup Ready canola are a progressive company trying to make their own money – the spin off is they make a product that makes me money. If it didn't make me money I wouldn't buy it."

Before leaving Australia for my GRDC-Nuffield tour, I contacted the Network of Concerned Farmers (an anti GM lobby group based in Australia). They were able to connect me with a few farmers in Canada who held concerns about GM technology.

I interviewed some of these farmers in Canada who had previously toured Australia warning about the dangers of GM canola.

Although I respect their concerns, I can only conclude that if their farming systems were adopted within Australia, we would have a bankrupt rural economy, with restricted ability to both feed our population and export.

Poorly informed by anti-GM forces

I have had the privilege of seeing and understanding for myself the international and domestic GM situation. And I believe that Australian farmers and the public are being poorly informed by well organised anti-GM campaigners.

There is absolutely no point in growing a product that the customer doesn't want. So I set out to see if Australia was receiving a price premium – or additional market access – by producing non-GM canola.

On the world market, once currency and sea freight rates are taken into account, conventional and GM canola is the same price. For example, 95 per cent of Australian conventional canola landed in Japan attracts the same price as that received by Canadian GM canola growers.

At peak production, one million hectares of canola was planted annually within Australia. But since 2002 total area seeded has reduced by 44 per cent with no improvement in five-year average yields. In contrast, average canola yields in Canada have increased by 15.8 per cent, with an increase in area seeded.

The market for oil-producing crops is expanding rapidly, but Australian farmers have been denied access to the best genetics in the world because of state government bans on planting GM food-crops.

Global acceptance of GM

In the past 10 years Canada has produced a total tonnage of GM canola equivalent to 50 years of Australian production. The argument that GM is untested, new technology, no longer holds water.

The huge tonnages that have been exported out of Canada – finding markets at the same price as non-GM canola – prove a broad commercial acceptance. I found a very good example of this when I stopped to take a photo in Germany of a farmer ploughing his field. I discovered that his tractor was running on cold-pressed canola oil. This GM canola had been grown in Canada, exported

AT A GLANCE

- Australia's canola industry is in decline, with no improvement in five-year average yields, and total area seeded has reduced by 44 per cent in five years.
- Canada has grown GM canola for 10 years, average yields have increased 16 per cent.
- GM and non-GM canola receive the same price on the world market.
- In the past 10 years Canada has produced a tonnage of GM canola equivalent to 50 years of Australian canola production.
- Canola oil is ideal for biodiesel and should put long-term stability in product demand.
- GM canola has assisted the Canadian wheat industry through rotational weed management options.
- There are yield advantages through hybrid varieties, particularly under moisture stress.
- Better fertiliser utilisation GM varieties are in the pipeline.
- There is an over-reliance of glyphosate within the Canadian farming system. An integrated weed management strategy in Australia is essential if we are to maximise the long term benefits of GM technology.
- Length of growing season and moisture are critical for maximising canola yields.
- Maintaining leaves on the stalk running up to flowering is essential for high canola yields.
- Sound environmental management and GM canola are complementary – promote this.
- Coexistence from paddock to port, of GM and non-GM can be achieved.
- In the future there will be a greater differentiation and application of specialty canola oils.
- Australian farmers and the public are being poorly informed by well organised, anti GM campaigners.
- The cost of the Roundup Ready technology for Australian farmers is significant, and needs to be reduced if we are to maintain a low input – low output farming system.

Review: GM canola

of the GRDC, investigates grain research and marketing profiles of our overseas competitors.

HT PRODUCT OR INTERNATIONAL BAGGAGE?

GRDC NUFFIELD SCHOLAR SEEKS SOME GM CANOLA ANSWERS

The Victorian and NSW governments have recently lifted their moratoria and have approved the planting of herbicide tolerant genetically modified canola varieties. GRDC supported Nuffield Scholar, Andrew Broad, believes that the use of biotechnology will play a significant role in Australia continuing to be a major player in the global grains market. But is GM technology good or bad for Australia?

To help answer this question, in 2006 Andrew travelled to eight countries, including 10 states of America talking extensively with farmers, researchers, marketers and consumers.



to China for processing, the meal used as a high protein stockfeed, and the oil then exported into Europe.

Additionally, the huge amount of GM canola that has gone into the human food chain, should put to rest some of the health concerns that are sometimes raised.

Australia-wide benefits

Rural Australia has been going through a tough time – we need leaders with vision.

- The use of GM canola for the biofuels industry would create additional rotational benefits and markets for the grain industry.
- The processing of the oilseed can be done in rural areas creating employment.
- The meal from the cold-pressed canola can provide a cheap high protein feed source for the dairy industry. Australia's dairy



There is a global acceptance and consumption of GM canola. Here, German farmer Ulrich Meyer runs his tractor on cold-pressed canola oil which started out life as a GM canola crop in Canada. The GM canola had been exported to China where it was processed into meal for stockfeed and the cold-pressed oil in turn exported by China to Germany.

industry is currently importing and feeding GM soymeal out of South America.

- The oil can be used as a blend for low emission renewable diesel fuel.

The issue of technology in agriculture is critical to the future of rural Australia. We ignore it at our own peril. We must farm in the real world, not the ideal world.

This is technology that will produce clear environmental benefits and put money into the hands of farmers, rural communities and the wider economy.

GM CANOLA AGRONOMY

Given good genetics the most important factor for maximising canola yield is length of growing season and adequate moisture.

The Canadian crop has a very short season, with only 45 days from seeding to flowering. In contrast, the European canola (known as oilseed rape) crop has an 11-month growing season.

Optimum seeding dates are August 10 through to September 20 in the UK, and harvest occurs in late July of the following year. Average UK yields are 3.3 tonnes to the hectare, with the best farms producing five tonnes.

Canola is a good extractor of soil moisture as long as there is a well-filled soil profile. One Canadian grower achieved a 2.5 tonnes per hectare crop on only 50 mm of rainfall in 2006.

The Australian growing season is long enough to produce world-class yields given access to good genetics, technology and moisture.

Canola seeding management

Seeding techniques in Canada differ from farmer to farmer, with little yield difference in row spacing from 18 cm (7 inch) to 30 cm (12 inch).

Most Canadian farmers are seeding at 5 kg per hectare, although some are moving to toward 3.5 to 4 kg. At 3 kg per hectare, the margin for error is very small.

Canola seed is a significant cost but recent advances in seeding equipment are making lower seeding rates possible.

As with any small seeded crop, seeding depth is critical. Canola germinates easily, so a depth of 1–2 cm into a moist firm soil is ideal. But dry seeding of canola is common practice in much of Australia, as moist soil is often rare at the optimum seeding date.

It is very important to get the crop sown early for maximum yield, but this puts great pressure on in-crop chemicals, allowing no time for a pre-sowing weed kill during late autumn breaks. The Roundup Ready GM technology adds much greater flexibility to an earlier seeding date.

Some very good research – and canola yields – are coming out of Europe. Test plots have shown yield potential in the UK of 7 tonnes to the hectare with one variety producing 7.8 tonnes in a test plot environment. Canola has a less visual response to differing establishment techniques. But the harvested yield usually shows that a seeding system which creates good soil conditions for the seed, and deep root penetration, is significantly better.

Dr Chris Green from Crop Management Information in the UK,

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said that of all broadacre crops, canola is probably the crop most responsive to good soil conditions.

In the UK to produce a canola yield of 7 tonnes per hectare, you need 50 plants per m², 168 pods a plant, and 15.12 grams of seed per plant. So, if every plant produced a golf ball-sized bag full of seeds, very high yields are achievable.

Again, in the UK, there is a tendency to sow a higher plant density and not be concerned about plants thinning. But higher yields tend to be achieved by aiming for 40 plants per m², and keeping plants alive.

Weed and insect control

As canola is a poor competitor, early weed control is essential. Flea-beetle poses an insect risk in Canadian seedlings in much the same way as red-legged earthmite does in Australia. I also observed many successful farming techniques from full deep tillage to complete no-till systems, each system working effectively for the farmer (given adequate nutrients).

Nutrition

Many times I had impressed upon me the importance of sulphur in the nutrient mix. Canola needs a balance of macronutrients to produce maximum yield – the big four being nitrogen (N), phosphorus (P), potassium (K) and sulphur (S). The recommended ratio in Canada is: 5 (N): 2.4 (P): 4 (K): 1 (S).

TABLE 1: Nutrients to produce a Canadian canola yield of 1.85 tonnes per hectare

	Uptake (kg/ha)	Removal (kg/ha)
N	100–123	61–74
P	46–57	33–40
K	73–89	16–20
S	17–21	10–12

Canola Council of Canada

Table 1 shows a typical nutrient uptake and removal profile in a Canadian canola crop yielding 1.85 tonnes per hectare.

It is important to apply adequate phosphorus and sulphur at seeding time – a large amount of phosphorus is used in the first six weeks of growth. Many farms in Canada are using liquid ammonium nitrate pre-seeding as a cheap nitrogen source.

But given Australia's marginal rainfall environment, nitrogen can be delayed as part of a cost management strategy. It can be added if seasonal conditions are favourable.

Small applications of boron will give a yield response. It appears that there are benefits to having 40 mg/kg boron in the youngest open leaf. This is a third of the level required for wheat. Also in the past, it was assumed that as the canola plant ran up to flowering, the leaves would drop off the stalk. There is now evidence to suggest that maintaining the leaves as long as possible is very important to maximising yield.

Chris Green from CMI believes the longer the leaves hang on, the higher the canola yield will be.

The most effective way of maintaining the leaf is through an application of nitrogen (10 kg per hectare foliar urea or 50 kg per hectare granule urea) and a fungicide which promotes leaf greening.

In Europe some strobilurin fungicides are used in canola at the start of flowering.

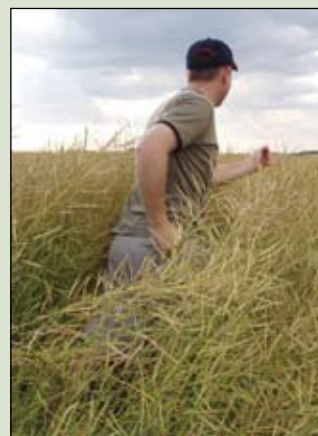
These agronomic practices are benefiting yield in Europe, and should be a benefit in Australia, given adequate moisture.

For more information contact Andrew on: Ph: 03 5437 3136 or Mob: 0428 373136, Email: andyrach@activ8.net.au

GLOBAL AGRICULTURE FROM AN AUSTRALIAN'S PERSPECTIVE

The following are some observations during my Nuffield tour in early 2006 which have particular relevance for Australian agriculture. With the most basic human needs being food and water, and Australia being a large exporter of agricultural food products, we have an important role to play on the global stage. But there are many challenges ahead.

- The single greatest asset in agriculture is people, and globally, the farmer is getting older. This is consistent with our ageing population, as the baby boomers reach their retirement years. But it is most important that the acquired knowledge and skill involved in food production is passed onto the next generation of farmers. There is a growing awareness of this, with some good examples being the New Zealand dairy industry through Dairy InSight and the Manitoba Agriculture, Food and Rural Initiatives Canada. Developing pathways into farming in Australia will need to be addressed.
- Global wheat trade is not a fair trading environment. There is difficulty in gaining a competitive advantage in a commodity-based product. But wheat isn't wheat the world over, and Australia has a reputation for producing a quality product, clean and low moisture. Australian wheat growers have been advantaged by the promotional efforts of AAVB Ltd. 'AAVB' has become a label, a brand name of quality and certainty.
- "Be good and tell and sell it." Australian farmers are good environmental managers, and we need to continue to be proactive in enhancing our environmental management skills. But we must also promote ourselves to Australia's urban population. The legislation currently being imposed upon the EU and Californian agriculture is not only enormous, but also built upon voter perception instead of science. Regulation, just to be seen to be 'doing something' doesn't necessarily help the planet. This is now having stifling effects upon the viability of industry. If we want sound environmental management, this is best achieved by a responsible and viable agricultural industry.
- "The most profitable day on my farm is the day I sit down and fill in my subsidy forms." (quote from a UK farmer). Although it may sound attractive to be subsidised, the subsidy programs tend to develop inefficiencies and stifle innovation. Of the farmers in Europe receiving subsidies, only the top 25 to 50 per cent of producers will remain viable – the remainder will eventually exit the industry. The increased number of member nations of the EU is putting huge pressure upon the Common Agriculture Policy budget.
- The US Farm Bill tends to restrict long-term continuity of agricultural policy by its complete rewriting every five years. Agricultural industries need clear long-term policy framework to set direction, and a gradual removal of US subsidies would both assist US and Australian agriculture. But don't hold your breath!



Andrew Broad showing Canadian farmers a hi-tech thing or two by performing the 'run test' to determine yield in a GM canola crop.