Challenges for irrigated canola in 2007

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in a nutshell

- Canola is a key ingredient in a sound winter crop rotation
- The price outlook is positive in the short, medium and longer term
- The keys to lower risk and more profitable irrigated canola in 2007 will be timely sowing and correct variety choice to match sowing time, irrigation at critical times if allocations permit, close crop monitoring and managing production costs while maximising yields
- Cutting the crop for hay in spring can be very profitable if there is high market demand

Crop rotations have been pushed to the limit in some regions and canola can be a valuable option in the rotations on irrigated and dryland farms.

Extensive surveys and trials of dryland crops across Australia have found that wheat yields are on average around 20% higher after canola than after wheat. Experienced irrigated canola growers have reported similar responses. Other benefits of canola are:

- higher two year gross margins
- cleaner paddocks to sow a cereal into
- less build up of grass weeds and associated problems
- herbicide resistance management, particularly when growing the TT varieties which allow growers to leave out a group A herbicide
- reduced root diseases after canola including Rhizoctonia

The price of canola (Jan 2007) is $455/t delivered Geelong, and is likely to stay strong due to global demand for oilseeds. The long-term average price (1995 to present) is between $365–370/t delivered port (based on industry sources).

Benchmarking

Close crop monitoring will be critical to make the most of 2007.

Benchmarking agronomic and financial information allows advisers to compare the management of the top-performing crops with the average and the poorer performing crops, and use this as a basis to develop improved recommendations.

A number of private companies along with the NSW DPI are involved in benchmarking, but the information gathered and methods used for benchmarking vary.

Time of sowing

Optimum sowing time & flexibility

The optimum sowing time for irrigated canola in the irrigation areas of southern NSW is mid–late April to early May, and by mid May for northern Victoria, although sowing can start from mid-April.

In low rainfall areas (< 350 mm) with no water allocation, canola should be considered as an opportunity crop to take advantage of a good early break and a forecast for a favourable season, and it should be sown before the end of May if there is available subsoil moisture.

In medium rainfall areas (350–500 mm) with no spring allocation, canola should ideally be sown by mid-May, although sowing into mid-June is possible in northern Victoria. If there is a late break, start to assess other crop options, particularly if there is no subsoil moisture.

Sowing canola late is costly – especially in hot & dry seasons

In 2007, many irrigators will have enough water for one irrigation only or may have no water at all for canola – so make the most of it by sowing on time. Late-sown canola crops generally have lower oil and yields, and require more irrigations to finish. They also emerge more slowly and are more susceptible to insect attack and waterlogging in winter. The "rule of thumb" is a 5% yield penalty per week delay in sowing.

A database of 197 crops grown in the Riverina and northern Victoria shows that Anzac Day was the median sowing date

for the top 20% yielding irrigated canola crops, for the period 1991–2003. In contrast, the median sowing date for the remaining crops was 9 to 10 days later (Table 1).

Late-sown crops experience more hot and dry conditions during the critical flowering and pod-filling periods than crops sown on time. Very hot weather during flowering can cause flowers to abort ('heat blast') and reduce potential yield. Hence, irrigated canola crops in the Riverina and northern Victoria have not consistently achieved yields similar to crops in the cooler regions of the high-rainfall zone.

In dryland trials, average temperatures did not correlate with yields, but had a bigger effect on oil content: the oil content rose by 0.8% for each 1°C drop in average temperatures from flowering to maturity, but only by 0.2% per 10 mm of in-crop rainfall.

Calculating potential yields using sowing date & subsoil moisture

Recently, a modified simple potential yield calculation was developed based on southern NSW data, which factors in time of sowing and available stored moisture. Using the model, APSIM, this calculation has potential for use in irrigated canola crops, so long as the combined in-crop rainfall plus irrigation does not exceed the equivalent of 450 mm. Target yields using this calculation are at 85% of potential yield, but may be higher depending on the soil type and grower experience.

Sowing very early

Very early sowing can cause excessive growth and lead to early spring moisture stress and sometimes lodging. For each month of earlier sowing, the crop will mature around 10 days earlier.

Stored subsoil moisture

Stored subsoil moisture is like insurance for canola yields. Every 10 mm of stored water translates into at least 0.15 t/ha of canola grain if in-crop rainfall is between 160–270 mm, according to APSIM modelling for dryland crops at Forbes, NSW. However, the relationship is weaker in drier or wetter years.

Table 1: Median sowing date and yield for 197 irrigated canola crops in the Riverina and northern Victoria from 1991-2003, based on maturity type. The data are benchmarked for the top 20% crops (highest yielding), average crops and the bottom 20% crops (lowest yielding).

Variety maturity	top 20%		middle 20%		bottom 20%		All crops
	Sowing date	Yield (t/ha)	Sowing date	Yield (t/ha)	Sowing date	Yield (t/ha)	Yield (t/ha)
Early	17 April	3.0 (20%)[a]	24 April	2.4 (5%)	1 May[b]	1.2 (1%)	2.8
Early-mid	na	na (0%)	16 April	2.4 (5%)	18 April	0.9 (10%)	2.0
Mid	25 April	3.0 (68%)	7 May	2.3 (66%)	6 May	1.1 (65%)	2.3
Mid-late	22 April	3.0 (8%)	28 April	2.2 (16%)	20 April	1.4 (18%)	2.2
Late	na	na (0%)	20 April[b]	2.3 (1%)	na	na (0%)	2.3
All crops	**25 April**	**3.0 (100%)**	**5 May**	**2.2 (100%)**	**4 May (100%)**	**1.2 (100%)**	**2 May, 2.3**

a - The figure in brackets after each yield value indicates the percentage of crops within the category
b - indicates small dataset, so view these figures with caution. Source of raw data: NSW DPI Cropcheck.
The number of crops in the database: Finley (127), Coleambally (35), un-named (13), Yanco (8), Kerang (5), Cobram (3), Deniliquin (2), Griffith (2), Hay (1).

Figure 1: The old message to grow canola in the best wheat paddock still holds true. Also particularly this year, consider herbicide residues following the drought, and strictly adhere to minimum re-cropping periods as there will be no room for error.

Figure 2: This year, consider reducing nitrogen inputs at the start of the season to levels required for a dryland crop, and then topdress between the 6-leaf stage and stem elongation if the crop is going to finish well.

Variety selection

Trials in south-east Australia showed that 8–19% of variation in yield came from variety choice. The best approach for selecting a canola variety is to stick to proven varieties, and try new varieties on a smaller scale. Check out http://www.acanvt.com.au/ACAS/ for national variety trial data for dryland canola.

Matching maturity type to irrigation timing & sowing date

Mid-season varieties are generally the best option in a normal year in northern Victoria. In regions which experience more hot days post-flowering (eg Murrumbidgee Valley), early-mid and mid-season varieties are normally preferred. This year, early maturing varieties are probably a better option in lower rainfall areas (< 350 mm), if water allocation is not assured for spring.

Maturity type needs to be matched to sowing date. For example earlier maturing varieties cope better with late sowing than late maturing varieties. If timely sowing is not possible this year, choose an early-mid variety if sowing in early May, or an early variety if sowing beyond early May in southern NSW.

Table 2: Summary of canola yields at the Victorian DPI Kerang irrigated trial site, with estimated mean yields from 2003 to 2006.

Variety	Year of release	Maturity	Type	Years of data	Overall yield	% yield AVSapphire	Lodging 2003	Lodging 2005
RT125	2007	Mid	Conventional	2	3.10	102		
Pioneer®44C11	2004	Early	Conventional	1	3.06	101		
AVSapphire	2003	Mid	Conventional	4	3.03	100		9
Hyola 75	2006	Mid-late	Conventional hybrid	1	3.02	99		
AGDrover	2004	Mid	Conventional	2	2.97	98		8
Skipton	2004	Mid	Conventional	4	2.92	96	3	6
AVRuby	2006	Mid	Conventional	4	2.90	96	2	8
Pioneer®46C04	2003	Mid	Conventional	4	2.89	95		
WarriorCL	2006	Mid	Clearfield	1	2.88	95		
Hyola 60	2001	Mid	Conventional hybrid	3	2.88	95	7	8
Rainbow	1993	Mid	Conventional	2	2.88	95	5	
Pioneer®45Y77	2006	Early	Clearfield	1	2.83	93		
Pioneer®46C76	2004	Mid-late	Clearfield	3	2.83	93		3
AGSpectrum	2004	Early-mid	Conventional	3	2.80	92	7	9
Lantern	2002	Mid	Conventional	2	2.78	92	4	
AVJade	2006	Early-mid	Conventional	4	2.77	91	6	9
AGCastle	2002	Mid-late	Conventional	2	2.76	91		8
Hyola 61	2004	Mid	Conventional hybrid	1	2.75	91	5	9
NMC131	2007	Mid	Specialty	1	2.74	90		
Thunder TT	2005	Mid-late	Triazine tolerant	2	2.70	89		7
ATRSummitt	2006	Mid	Triazine tolerant	1	2.64	87		
Pioneer®45C05	2003	Early-mid	Conventional	2	2.64	87	4	
Charlton	1998	Mid-late	Conventional	2	2.61	86	3	
MC202	2004	Mid-late	Specialty	2	2.59	85	3	
Surpass 603 CL	2001	Mid	Clearfield	4	2.59	85		
ATRGrace	2001	Mid-late	Triazine tolerant	2	2.55	84	7	9
Rocket CL	2005	Mid-late	Clearfield	1	2.51	83		
ATR409	2007	Early	Triazine tolerant	2	2.45	80		
Bravo TT	2005	Early-mid	Triazine tolerant	2	2.40	79		7
Tornado TT	2004	Mid	Triazine tolerant	2	2.38	79		6
ATRBeacon	2002	Early-mid	Triazine tolerant	2	2.35	77		

*Lodging is scored subjectively: 0 = horizontal, 9 = vertical. Minimal lodging in 2002 and 2006, Data unavailable for 2004.

TT yield penalty & hybrid vigour

Triazine tolerant (TT) varieties are inherently lower yielding than Clearfield or conventional varieties with yields only 77 to 89% of the non TT types (Table 2). These varieties should only be used when the weed population necessitates their use, or when triazine residues from the previous year (eg, sometimes after maize) limits the cropping options.

Lodging

Some varieties are more prone to lodging under irrigation than others. Lodging is influenced by sowing date, establishment rate and up-front nitrogen levels. High plant populations, sown early with lots of nitrogen result in huge biomass, often leading to lodging.

Disease resistance

The risk of blackleg is still an issue this year. All varieties have a blackleg resistance rating of 4 or more this year, which is the minimum for low rainfall areas. The minimum is 6 for other areas. Refer to the Australian Blackleg Management Guide – (see http://canolaaustralia.com/__data/page/80/BMguide.PDF).

Dry sowing

Dry sowing has its risks, but experience from growers in Victoria in recent years has shown that with late breaks dry-sown crops have generally performed much better than crops which have been sown later on cultivated soil. However, dry sowing with no subsoil moisture is a very risky proposition if irrigation water is not assured for spring.

Dry sowing is not recommended in NSW irrigation areas.

Paddock selection

The old message to grow canola in the best wheat paddock still holds true. Also consider herbicide residues following the drought, and strictly adhere to minimum re-cropping periods as there will be no room for error this year.

Irrigation management

For irrigators with no water allocation in low rainfall areas, canola can be an opportunistic dryland crop. This should only be considered if a good, early autumn break takes place and there is good subsoil moisture at sowing.

Drought stress

Water deficit stress during flowering can halve canola yields.

Where only one watering is possible this year, one option is to sow canola if there is a good, early autumn break and irrigate by early flowering or as soon as water becomes available. If it is another dry season, it may be cost-effective to use the water on other crops and cut the canola crop for hay.

In areas with more reliable spring rainfall, the other option is to pre-irrigate or water-up (on soils that do not crust), sow on time, and treat the crop as a dryland crop. It has been suggested that pre-irrigation is only cost-effective if water is less than $100/ML.

Waterlogging

One of the main limitations to high yields on irrigation is waterlogging in winter and early spring. Further information on irrigation layout and management can be found in the article 'Is there a place for canola on irrigation?' in the Farmers' Newsletter, No. 172, Autumn 2006, pp 12-15; or on the IREC website http://www.irec.org.au/farmer_f/pdf_172/Canola%20on%20irrigation.pdf

Reducing the up-front costs of canola

Managing costs without compromising profitability is important. Benchmarking of 29 canola crops by consulting firm Holmes and Sackett (mainly in NSW, but also Victoria and Tasmania) found that the most profitable and water-use efficient canola crops actually had lower variable costs (but higher fixed costs), and vice-versa.

Nutrition

Nutrient inputs need to be tailored to target yield. Fertiliser, particularly nitrogen, is the biggest single variable cost for canola and carries with it financial risk if the season shapes up poorly.

Roughly 40 kg/ha of nitrogen is removed per tonne of grain, and the rough "rule of thumb" is that the crop needs 80 kg N/ha to produce one tonne of grain.

This year, nitrogen inputs at the start of the season can be reduced to levels required for a dryland crop. Dryland trials in NSW and Bendigo have shown that delaying or splitting nitrogen fertiliser applications usually has no yield penalty associated with it when there is at least 40 kg N/ha in the top 50 cm at sowing time.

One strategy for irrigation is to apply starter nitrogen (eg 22 kg N/ha as 125 kg/ha DAP), if there is a reasonable soil nitrogen level (eg 60–70 kg N/ha). The crop can be topdressed to make up the required amount of nitrogen (assuming 80 kg of nitrogen per tonne of grain targeted).

Figure 3: Water deficit stress during flowering can halve canola yields. Where only one watering is possible in 2007, an option is to sow canola if there is a good, early autumn break and irrigate at early flowering.

A realistic target yield is needed, and deep soil tests should be undertaken as close as possible to sowing time. Splitting the nitrogen applications allows growers to re-assess target yields throughout the growing season and removes some of the risk involved in growing canola.

Topdressing is best conducted between the 6-leaf stage and stem elongation.

Unlike nitrogen, there is no room for error with phosphorus, as it needs to be applied up-front. But there may be certain situations where phosphorus rates may be reduced this year.

Gypsum applications can be deferred this year, unless it is the only source of sulfur.

Fungicide seed treatments

Responses to fungicides are much less likely with blackleg resistant varieties. In southern NSW, responses to fungicides are more common than in Victoria, but are far less marked in resistant varieties.

Sowing rates – are we throwing away money?

Plant densities of 40–50 plants/m^2 are considered ideal for irrigated canola to prevent lodging. However, plants densities of late-sown crops can be up to 75 plants/m^2 without yield loss. Early sown crops can compensate better for low plant populations than late-sown crops.

Twenty per cent of irrigated canola crops in the Cropcheck database had more than 75 plants/m^2. (As a general rule 1 kg/ha of seed produces 25 plants/m^2). More than half of these growers sowed canola at 5 kg/ha or more, but 3–4 kg/ha is now considered sufficient. The better the paddock preperation, the lower the required sowing rate. For example, where there is a good seedbed and ample moisture, 3 kg/ha is possible. On cloddy soils with marginal moisture, a sowing rate of 5 kg/ha may be necessary. Some dryland no-till croppers in the Victorian Wimmera have successfully reduced sowing rates to 1–2 kg/ha, apparently without penalty.

Retaining seed may be false economy

Seed from 2006 should be germination tested before sowing. Sowing retained seed is not generally recommended. Dryland trials have shown an average 12% yield decline with poor-quality retained seed (and in one case, complete crop failure) when the crop suffered from a dry finish. Yields of crops sown with certified seed are more consistent.

Price outlook

The price outlook for Australian canola is strong in the short-term due to the drought ($90/t above average). The price will remain buoyant in the medium to long-term due to strong demand for biofuels which is resulting in an increased area of corn at the expense of soybeans in the US.

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Further information

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Figure 4: Seed from 2006 should be germination tested. Dryland trials have shown an average 12% yield decline with poor-quality retained seed when the crop suffered from a dry finish. Yields of crops sown with certified seed are more consistent.