CANOLA IN THE NORTHERN REGION: WHERE ARE WE UP TO?

JF Holland[1], MJ Robertson[2], S Cawley[3], G Thomas[4], T Dale[5], R Bambach[1], B Cocks[6]

[1]NSW Agriculture, Tamworth Centre for Crop Improvement, RMB 944, Tamworth, NSW
[2]CSIRO Sustainable Ecosystems / APSRU, 120 Meiers Rd, Indooroopilly, Qld
[3]Farming Systems Institute, QDPI, Roma, Qld
[4]QDNR&M, Leslie Research Centre, Qld 4350
[5]NSW Agriculture, Gunnedah, NSW 2380
[6]CSIRO Sustainable Ecosystems / APSRU, Tor St, Toowoomba, Qld

ABSTRACT

We outline the recent resurgence in canola production in the northern grains region and discuss issues of: grower attitudes to climatic risk, agronomic options to minimize frost risk, cultivar performance, rotations, nutrition, harvesting, and marketing. We end with an assessment of the future of the industry in the northern region.

HISTORY OF CANOLA IN THE NORTH

At a previous ARAB conference, John Slatter discussed the potential of canola in the north eastern region of Australia (Slatter, 1989). Significant areas were grown in the early 90's (Figure 1), but the crop suffered from frost damage, a series of drought years and the consequences of canola being a non-VAM crop (Slatter, pers. comm.), and the area dropped away. Yield and oil content were variable and often disappointing. Problems with crop production were often cited as being due to variable climatic conditions, poorly adapted cultivars, poor establishment and inadequate nutrition. Frost at the early stages of pod filling devastated a number of commercial crops, leading to the perception that canola was poorly adapted to northern climatic conditions. In addition, in areas with significant summer cropping, it was noted that canola suppressed establishment and growth of subsequent sorghum and other summer crops.

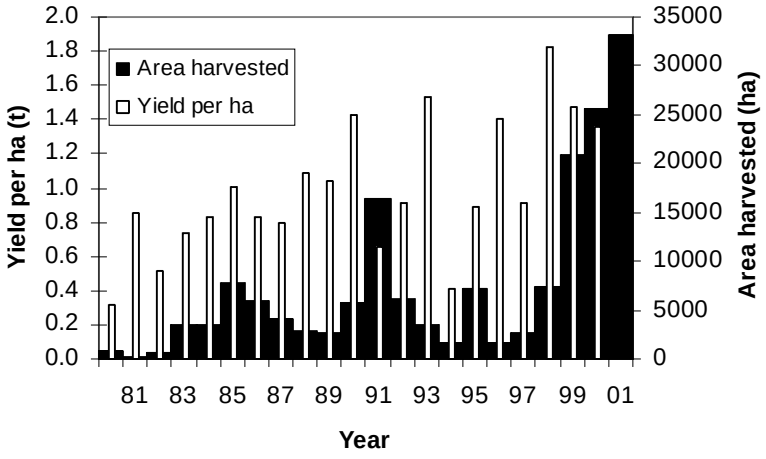

Figure 1: Recent historical area and yield per hectare of canola in the north-west slopes districts of NSW, and Queensland. Area for 2001 is an estimate at the time of writing.

The widespread adoption of canola in southern and western Australia in the mid-late 1990's, together with the advent of earlier maturing cultivars and favourable prices has fuelled resurgence

in interest in the crop. Since 1998 there has been strong growth in the canola area, particularly in north-west New South Wales (Figure 1), accompanied by a notable increase in yield per hectare. Despite the growing optimism for the crop in the north, a number of issues remain to be addressed. This paper discusses the state of the canola industry in the north and reports on progress in research and development conducted by NSW Agriculture, CSIRO and Queensland DPI.

GROWER PERCEPTIONS OF CANOLA IN THE NORTH

As canola is a relatively new crop to the northern grains region, experience is limited on yield expectations and seasonal variation in yield and oil content. We surveyed 46 growers, from northern NSW and southern Qld, during the 1999-2000 period and asked them to estimate their expected canola yields and oil contents in the highest-yielding 25% of seasons, an average yield and the yield in the lowest-yielding 25% of seasons. The wide range of results is shown in Figure 2. We also asked them to rate the riskiness and technical difficulty of growing canola relative to wheat, the major winter crop in the region. About half of the respondents had grown canola before.

The mean yield of all those respondents that had grown canola before varied from 1.4, 0.9 to 0.3 t ha^{-1} for the three types of season, respectively. Non-canola growers (data not shown) were more pessimistic with mean yields of 0.9, 0.5 and 0.2 t ha^{-1}. In terms of oil content, growers expected it to vary from 42 to 39 to 32%, respectively. Growers perceive canola to yield about 55% of wheat in high to medium-yielding season, but 45-50% in low yielding seasons. Both new and experienced growers rated the growing of canola at a similar technical difficulty, but more risky, than wheat growing. All growers we surveyed said that the reason they were growing canola or were interested in growing canola in the future was for the rotational benefits, particularly to control diseases in wheat-based rotations. Anecdotal evidence also suggests disenchantment with wheat prices has encouraged investigation of alternatives.

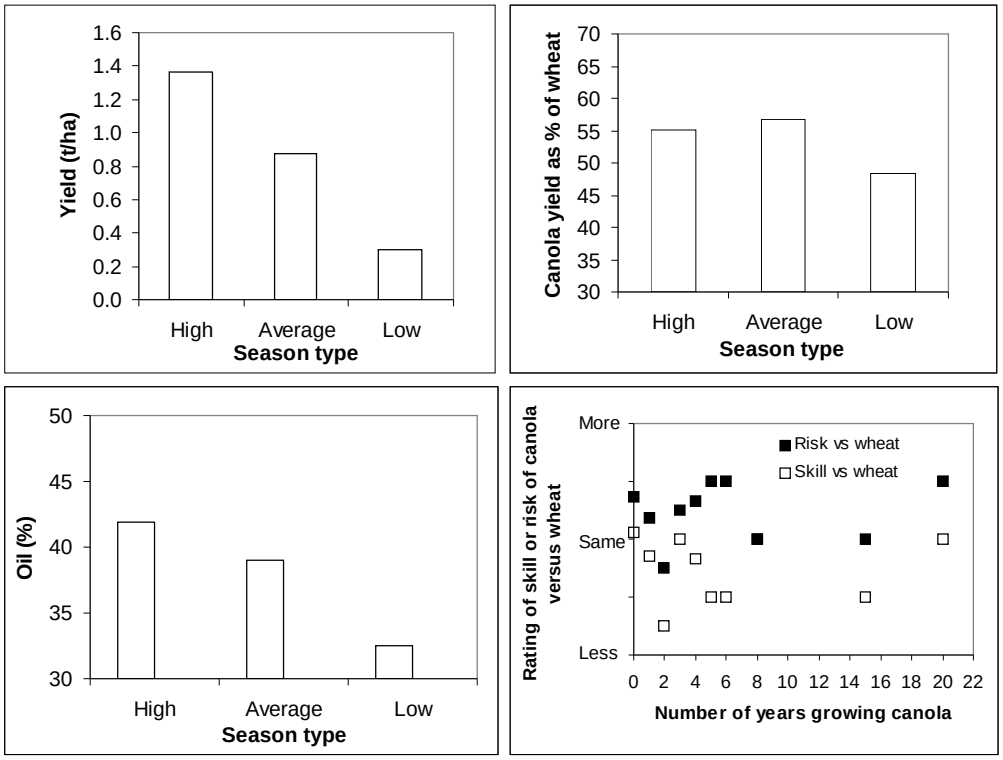

Figure 2: Survey results of growers' perceptions of the risks of canola in the northern grains region.

COPING WITH CLIMATIC RISK

Experiences with canola in the northern region in the late 1980's and early 1990's suggested that, with the then current cultivars and early-season sowing, the risk of yield damaging frosts was high. In our survey, frost risk was ranked the second highest risk factor out of a list that also contained harvesting losses, high temperatures during grain-filling and planting opportunities. Traditional practice in the northern grain belt is to sow winter grain crops in early-May to late June, a time which in some years predisposes crops to damage by spring frosts through flowering being too early. The recommended strategy to minimise frost risk in canola is to sow a cultivar appropriate to the sowing date so that flowering occurs after the main frost risk period. The arrival at an optimum sowing time will depend on tradeoffs between lowered frost risk with delayed sowing and lowered yield potential and oil content. We have been able to show that it is possible to minimise frost risk to around 10% by appropriate choice of cultivar phenology for given sowing date (Robertson et al. 2001). The impact of delayed sowing on lowering frost risk in northern locations is particularly strong between mid-April and mid-May. As a result of these analyses the current recommendation is that early cultivars should be sown no earlier than 15th May, while late flowering cultivars should be sown no earlier than the first week of May (Holland et al., 2001). It is generally common practice that growers will select a cultivar/cultivars some time before the opening of the sowing window in anticipation of a particular season. If that seasonal forecast changes growers are often limited in their ability to swap cultivars by the availability of certain lines and the existing financial commitment.

CULTIVAR PERFORMANCE

The main features to consider when selecting a cultivar to grow in the region are: maturity, yield, oil content, protein content, herbicide tolerance, blackleg resistance, crop height and early vigour. The older cultivars continue to yield well but are being challenged for yield by many recently released cultivars and a hybrid with often 3 to 4% higher oil contents. The triazine tolerant (TT) cultivars are about 20 % lower yielding in trials than conventional cultivars with similar oil contents to Oscar. Despite this, farmers have reported relatively good results from TT cultivars where serious weed problems exist. There is a risk on alkaline soils of the region for triazine herbicide residues to affect the following winter cereal. Prior to use of TT canola, it is advised that consultation on Integrated Weed Management be undertaken with an accredited agronomist. The imidazolinone tolerant cultivars have mostly performed relatively well in trials. Selection for blackleg resistance is likely to become more important as more canola is grown in the north. Therefore, the choice of cultivars with the highest resistance is indicated after selection for maturity, herbicide tolerance, and economic return.

AGRONOMIC ISSUES

Rotations

Crop rotations in northern NSW and southern Qld are dominated by the winter cereals wheat and barley. Disease problems are occurring with these crops such as crown rot and yellow leaf spot of wheat and net blotch of barley. These diseases could be reduced with greater use of non-cereal rotation crops such as canola and mustard, particularly as these crops have been shown to actively control diseases such as take-all in southern Australia (bio-fumigation). The wet 1998 and 1999 seasons demonstrated the limitations of our existing farming systems, with wheat and barley suffering severe disease and quality downgrade with wet harvests, whereas canola has yielded well in experiments throughout the northern region in both seasons with no significant disease problem and an ability to withstand the wet harvest periods. In terms of grass weed control in winter cereal crops, growing canola provides an alternative to the traditional sorghum option.

Table 1: Yield and grain protein of wheat following various winter crops at Nindigully, Qld in 1998 and 1999, and Walgett in NSW in 1999.

Previous crop	Yield (kg/ha)	Protein (%)
Nindigully, 1998		
Wheat	1836	13.4
Chickpea	2449	13.4
Canola	2586	13.4
Nindigully, 1999		
Wheat	4010	12.2
Chickpea	3990	13.6
Canola	3940	12.8
Walgett 1999		
Wheat	2100	11.0
Chickpea	2600	13.2
Barley	1900	11.0
Mustard	2700	12.6
Canola	3100	11.4

Early results from rotation experiments near Walgett and St George involving canola have shown higher yields of wheat following brassica crops than those after either winter cereals or chickpeas (Table 1), supporting results from southern Australia that the brassica crops are actively controlling cereal diseases. However, the possible negative effects of canola in rotation, which are possibly more important in the north (run-down of VAM and allelopathic effects on double-cropped summer crops), will need to be studied and taken into account in devising rotations involving these crops. We have observed strong deleterious effects of canola stubble on the establishment and early growth of grain sorghum and other summer crops. Even wheat can be adversely affected by canola on low phosphate soils (Thompson, 2001).

Nutrition

In our survey growers said that they would usually apply P to their wheat crops with rates ranging from 20 to 40 kg ha^{-1} of MAP or Starter Z, which correspond to 3.5 to 7 kgP ha^{-1}. Of the 46 respondents to the survey, 44 said they would apply the same rates of P to canola and wheat, 2 said they would apply more to canola, and two said they would apply less to canola than wheat. This result is concerning given the documented higher requirement of canola for N, P and S compared to wheat. Trial results have shown large responses to P in experimental and commercial situations where growers would not normally have planned on applying P (Table 2).

Table 2: Response of canola to applications of P in experimental and commercial crops.

Site	Season	Sowing date	Canola cultivar	In-crop rainfall (mm)	Bicarbonate extractable soil P (mg/kg) 0-15 cm	Yield (kg ha^{-1}) Zero P	Yield (kg ha^{-1}) 7-8 kgP ha^{-1*}
Dunkerry Sth	1998	14 May	Hyola42	420	9.0	1164	1393
Dunkerry Sth	1999	17 May	Hyola42	173	9.0	890	1041
Winnathoola	1999	1 June	Mystic	122	17.0	290	590
Somerset	1999	17 May	Monty	142	7.4	140	870
Milroy	2000	12 May	Mystic	76	5.8	1161	1700
Melvyn	2000	11 May	Mystic	56	15.2	86	760
Kilburnie	2000	5 June	Mystic	46	23.8	113	353

*7-8 kgP ha^{-1} is equivalent to 40-50 kg MAP ha^{-1}

Experiments in northern NSW have shown that canola is more responsive to phosphate fertiliser than wheat (Holland et al., 2001).

Harvesting losses

While most crops in southern Australia are windrowed before harvest, traditional practice in the northern region has been to direct-head due to lower yields and availability of swathing gear. In our experiments, where hand-harvest and machine-harvest yields have been made, it has been possible to determine the extent of harvesting losses in commercial crops. For example, in five crops of Monty sampled in 1998-2000, harvesting losses were 9, 17, 40, 58 and 90%. The occurrence of disturbingly-high losses in some crops, suggests that there is a need to design methods of harvest management for the lower-yielding and more rapidly-maturing crops in the northern region.

MARKETING ISSUES

Feedback from growers indicates that distance from the current delivery point at Newcastle is the biggest factor limiting the expansion of canola in southern Qld and far northern NSW, transport costs being from $40/t ex-Goondiwindi to $50/t ex-Roma. At present there is no bulk handling of canola grain at railway sidings as with cereals nor will there be until there are significant tonnages grown – a Catch 22. There is a very small local bird seed and stock feed market available on the Darling Downs (<200t). There is, however, a potential market niche in being able to market the crop before the rest of the industry and potentially capture high early-season bonuses, as crop harvest in the most advanced districts of the northern region begins in the first week of October. These bonuses need to be in excess of the transport costs. In the marketing of canola as a crop option to growers there is increasing interest in looking at its impact over a rotation period rather than just a one-crop return.

THE FUTURE

We believe there is a future for the crop in the north (perhaps 15% of the wheat area), mostly driven by the pressures of disease and weed problems in wheat-based systems. We have some preliminary results that suggest that the drought-tolerance of canola-quality mustards may have a role in the more difficult environment the crop faces. The issue of distance to market is yet to be resolved.

ACKNOWLEDGEMENTS

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