Experiences in growing canola in north-west NSW

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Abstract

Canola has been grown in north-west NSW since the early 1980s with a mixture of success. The main reasons for variable yields has been the lack of suitable equipment and knowledge of establishment on black soils, limited cultivars available for our short winter and the traditionally hot, dry finish. Growers lost confidence in canola in the early 1990s due to extensive frost damage across the plains. In 2000, the closure of Cargill’s oilseed crushing plant at Moree substantially increased transport costs. This closure, coupled with a variable market, disheartened more growers. Canola is a higher risk, management and input crop than cereals, which is a deterrent to some farmers.

Despite these problems, core areas of varying size have been consistently grown. Canola can be as profitable as cereals in all but the driest seasons. In addition, canola is an excellent rotation crop for winter cereals, particularly in controlling crown rot. Over the next five years it is predicted that areas of canola will continue to expand gradually as agronomic knowledge and cultivar improvement continue. The real growth area in \textit{Brassica} production in the hotter and drier parts of the north-west is likely to be in mustards, both condiment and canola quality oil varieties, due to their better drought tolerance and consequently higher yields in the harsher climate.

Keywords: mustard, rotations, establishment, frost, sowing time, dryland and irrigated production.

Introduction

In northwest NSW canola is likely to play an increasingly important role as a crop rotation in farming systems which are still predominated by wheat. Canola usually yields between 40–60 \% of wheat, which equates to average yields in average seasons of 1.5 t/ha. Yields of up to 3.0 t/ha have been grown under very favourable dryland conditions (Holland \textit{et al.} 2003). In very dry years, for example, 2002, canola still yielded about 40\% of wheat (1 t/ha). While canola and mustard can have negative effects on subsequent crops due to VAM and allelopathic issues, they are beneficial in lowering cereal root disease levels, including crown rot. When followed by wheat, canola gives yield advantages of between 0.6 and 1.0 t/ha (Holland and Bambach 2002).

Growers lost confidence in canola in the early 1990s due to extensive frost damage across the plains, in a season when crops were seen to have a high yield potential. While sowing later on a very full profile of soil water or changing varieties can reduce frost risk, it is still recognised that canola is sensitive to frost about three weeks earlier than wheat, given currently recommended sowing windows.

In 2000, the closure of Cargill’s oilseed crushing plant at Moree, substantially increased transport costs. This closure, coupled with a variable market, disheartened more growers, however, as improved cultivars are available, combined with some limited local processing and improved prices; there has been resurgence in popularity from the core growers.

Canola production in north-west NSW

Canola was first grown on a commercial scale in north-west NSW in the early 1980s (Shaw 1986). The area grown has varied due to success and failures in growing the crop, as well as market prices and transport costs. Growers attitude to canola as a more risky crop to grow also influence their seasonal
choice to plant it. For example, in 2002 when there were many indications of a drier than average year, there was a reduction in planting area.

Figure 1 shows the areas sown to canola since 1980. The area is currently at an all time high and forecasts predict the area to further increase steadily. Crop yields have also increased (Figure 2) from around 0.7 t/ha in the early 1980s to average commercial yields of around 1.6 t/ha in the last four years (Holland and Bambach 2002). This increase in average yield is likely to be as a result of improved cultivars as well as agronomic practices such as controlled traffic, zero till, improved nutrition, time of sowing, weed control, establishment and harvest management.

An ideal sowing time in north west NSW is a trade off between maximising yield and oil content by early sowing and minimising frost risk in both the late flowering and pod-fill stages, by delaying sowing. Mid-season varieties are usually sown between early and mid-May and early maturing varieties from mid to the end of May. In the Gunnedah and Tamworth districts, sowings may continue into the first half of June (Holland et al. 2003), while around Coonamble and Walgett, sowing may be pushed forward into the end of April and is usually finished by mid-May. These planting times have been recommended based on the number and timing of frost.

As canola and mustard require high levels of input costs, such as fertiliser, crops need to be sown into paddocks with good to excellent soil water (120 mm plant available water in eastern areas, with 150–180 mm plant available water more desirable in western areas). Evenness of crop establishment was a big issue in conventional tillage systems of the 1980s when the longer cultivars were sown in April. This was due to high soil and daytime temperatures in April, unreliable rainfall and often sporadic storm rain. By moving the sowing window back to end of April and beginning of May combined with sowing into a controlled traffic, zero till situation with improved seeding technology, this situation has improved. In addition to controlled traffic and zero till assisting in moisture preservation and therefore germination, canola seed is now commonly sown at a depth of 7.5 cm, with 0.5 cm of soil cover pressed by a press wheel using similar weights as would be used for wheat. Prickle chains are also sometimes used for improved seed-soil contact. Plant populations of 30–50 plants/m² are aimed for, which is often achieved with sowing rates of between 2–3 kg/ha.

Following a cereal crop, canola generally requires between 60 and 160 kg/ha of fertiliser nitrogen, which are the levels being used to grow prime hard and durum wheat and on the northern plains. Holland and Bambach (2002) have noted that canola seems to have a higher requirement for phosphorus. The responses to zinc have not yet been quantified in northern NSW, however growers have commented on visual responses in some years. As many of the black, grey and brown clay soils in northern NSW have deep soil bands of gypsum (usually in the 60–90 cm depths) fertilising with 10 kg/ha of sulphate sulphur is generally adequate to supply early crop requirements. This is based on work done by Incitec in the early 1990s.

While some insects do damage to crops, others warrant control in most years. Cutworms may be problematic in the seedling stages of canola in the northwest, so careful monitoring is required. These
insects may decimate crops within 2 to 3 days. Blue oat mite and armyworms are also issues in some years. Aphids were considered a problem in one in three years; however, the past five years have seen growers apply aphid sprays almost every year. Heliothis sprays are required in approximately 70% of years. Slugs have also been a problem in certain years, such as 1999.

To windrow or not?

The view on whether or not to windrow varies with agronomist and growers. Many growers east of Narrabri and Moree do not windrow. Around Gunnedah, approximately half the growers direct head. The argument against windrowing in the north includes the following points:

- Farmers in the north are used to taking the grain off as soon as it is ripe because of our summer storms, and so many own their own headers and have good access to additional contractors. Getting the crop off on time is therefore not an issue. Summer storms can be a problem if the crop is on the ground.
- The heavier black, grey and brown clay soils appear to produce a more consistent field ripening than the southern red undulating soils.
- Climatically the warmer spring temperatures bring the crop in relatively quickly as compared to the southern situation.
- Some growers have commented that they can not recover associated costs of windrowing with extra yield.
- There have been bad experiences where the winds have blown light windrows away; light windrows were not able to be harvested and were consequently bulldozed; and Rutherglen bug infestations of windrows have made the crop difficult to harvest.

Many growers around Walgett, Coonamble and Gunnedah use windrowing. The argument for windrowing in the north includes the following points:

- earlier harvesting (7–10 days)
- assists in more uniform ripening
- less exposure to summer storms
- reduced shattering loss
- less hail and wind losses (Holland 2003)

There are plenty of windrowing contractors waiting to start the season in the north, so windrowing can be done in a very timely manner.

Obviously the jury is still out on whether or not to windrow, however it does seem that the areas where growers are growing larger paddocks of canola and where they are more reliant on harvesting contractors, are where windrowing is favoured.

Advantages of canola as a rotation

Agronomy

Wheat yields following canola show improvements of between 0.6 and 1.0 t/ha following canola and mustard. This is thought to be mainly due to reduced levels of cereal root diseases, such as crown rot (*Fusarium pseudograminearum*), giving yield advantages to the following wheat crop (Table 6).

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Wheat yield (t/ha)</th>
<th>% Crown rot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Following canola (mean of 3 varieties)</td>
<td>3.1</td>
<td>12</td>
</tr>
<tr>
<td>Following chickpea</td>
<td>2.6</td>
<td>16</td>
</tr>
<tr>
<td>Following wheat (mean of 4 varieties)</td>
<td>2.0</td>
<td>23</td>
</tr>
<tr>
<td>Following barley</td>
<td>1.9</td>
<td>51</td>
</tr>
</tbody>
</table>

Table 6: Wheat yields (t/ha) and % crown rot infection following a canola, chickpea, wheat or barley rotation. (Holland pers. comm.).

There have been dramatic improvements in cultivars for the area, especially more western parts of the northwest. Quick varieties are essential to cope with the winter conditions turning to spring and then to summer within three weeks of September. An example of these cultivar improvements is that Monty was popular in the late 1990s. In 2001, Monty was out-yielded by the new variety Rivette by 18% throughout northern NSW.

Other advantages of canola as a rotation include that it gives an opportunity for an inexpensive in crop black oat control spray. Growers generally spend $15/ha on grass weed control in canola versus $30/ha in wheat. There is also evidence of good soil physical conditioning in our swell and shrink soils, from a vigorous taproot and drying out the profile. The canola crops also leave root channels that subsequent wheat crops can utilise.

Risk Management

Canola crops offer considerable advantages when looking at managing risk in a farming system. The crop is priced on the oilseed market and therefore allows risk management diversification. Unlike crops such as chickpeas and faba beans, canola tolerates wet conditions reasonably well in terms of disease management, so as risk management strategy to cover different types of seasons, canola can offer advantages.
Canola also offers the chance to spread winter crop sowing window, allowing the spreading of machinery and labour resources, as most growers do not sow more than 30% of their area to early sown cereal varieties such as Sunbrook. Harvest may clash with wheat, barley and chickpea, depending on the season.

Irrigated Production

There are only a limited number of experiences of growing canola under irrigation in northwest NSW. From these experiences, the crop has yielded well (approximately 2.5 t/ha) and canola works well with most cotton rotations. If the season has little in-crop rainfall, three irrigations may be needed, including a watering up, and irrigations during early flowering and early pod fill. Canola volunteers may be a problem if a fallow does not follow the canola crop.

There is substantial evidence to date that canola, and mustard to a greater extent, maintains or decreases black root rot (*Thielaviopsis basicola*) levels (Jhorar 2003). Unfortunately canola and mustard rotations have been found to increase the fungus levels of Fusarium wilt of cotton (*Fusarium oxysporum f.sp. vasinfectum*) (Nehl pers. comm.).

Issues to be addressed in growing canola as a rotation

Agronomy

While breeding programs have made significant improvements in cultivars available, further improvements in virus tolerance, oil contents and yields are requested by growers. There has always been a need in the north for maturities which flower quicker than those in the south. The new cultivars must also mature relatively evenly as the maturation period is often quicker in the north.

Broadleaf weed control, in particular the Brassicaceae family, are still an issue for some growers, particularly those on lighter soils. In other instances, excellent broadleaf weed control in the previous cereal crops, combined with the use of an effective knockdown herbicide at sowing, gives good control within the canola crop.

Canola and mustard can cause a decrease in Versicular Arbuscular Mycorrhizae (VAM) in the soil, and most summer crops are moderately dependent on this fungus. To illustrate this, mungbean crop height was measured at Tamworth following wheat, mustard and canola. The mungbeans were sown at the end of December 2000 and measured at the beginning of February 2001.

Table 7 suggests that following canola or mustard, we need to carefully choose a crop. As similar results have been found with grain sorghum as mungbeans, winter cereals may be more appropriate.

As well as VAM issues, canola and mustard can have dramatic effects on establishment of summer crops, such as sorghum and mungbeans, sown directly after harvest in terms of allelopathogens. Examples of this were seen in 1998, at the Tamworth Agricultural Institute, where sorghum establishment after canola was 16% of the number of plants/ha of sorghum establishment after wheat. While experiments are continuing, it currently appears that the allelopathic effect disappears about one month after harvest of canola or mustard (Holland and Bambach 2002).

Virus in canola has not been significant up to date.

Table 7: Plant height of mungbean sown after wheat, canola and mustard at Tamworth in the 2000/01 season (Holland pers. comm.).

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Height (cm)</th>
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<tbody>
<tr>
<td>After wheat</td>
<td>22</td>
</tr>
<tr>
<td>After canola</td>
<td>18</td>
</tr>
<tr>
<td>After mustard</td>
<td>16</td>
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Marketing

Due to Cargill closing its crushing plant at Moree at the beginning of 2000, most growers have to deliver to Newcastle for Cargill contracts. Oleo Industries based in Moree did source canola in limited tonnages in 2002 and within a 100 kilometre radius from Moree. There have therefore been additional freight charges for many northern canola growers over the past two seasons. Local growers also comment on disparities with oil and yield payments, in their view.

Conclusion – the future of canola and mustard

We believe there is a huge potential for canola and mustards for the North-west Slopes and Plains. With a high degree of management, yields of 1.5 to 2.5 t/ha may be achieved in many years under dryland production.

In order to achieve this, the onset of hot weather has to be managed with sowing time and balanced with frost risk and the selection of paddocks with a full profile of moisture. Breeding quick maturing cultivars with good yield and oil content will help address this issue. In addition to these breeding issues, there is a need for growers to be able to locally store and/or crush the canola.

Over the next five years it is predicted that areas of canola will continue to expand gradually as
agronomic knowledge and cultivar improvement continue. The real growth area in Brassica production in the hotter and drier parts of the north-west is likely to be in mustards, both condiment and canola quality oil varieties, due to their better drought tolerance and consequently higher yields in the harsher climate. Mustards offer a number of advantages, including the possibility of direct heading. Prior to widespread commercial plantings of mustard, management of virus as well as fine tuning sowing time and other agronomic issues need to be addressed.

Acknowledgements

Sean Boland, Michael Smith, Dave Wood, David Nehl, Om Jhorar,

References


