Open-pollinated (OP) canola produced their maximum yield at higher densities than hybrid canola varieties, and therefore require higher densities to achieve 80-90% of maximum yields. For OP canola 80% of potential yield was achieved at 15 plants/m² and 70% at 10 plants/m².

**Reseeding**

In 2014 year we conducted a series of reseeding trials, where we compared the value of different re-seeding options:

- sowing before or at the break of the season, at plant densities of 5, 10, 15 and 30 plants/m² compared with
- sowing three weeks later, at densities ranging from 5-60 plants/m² (to mimic reseeding) and
- reseeding over the top of some of the early sown low density plots in an effort to add to early sown plants.

The most successful trial of this series was at the Northern Agri Group’s (NAG) main trial site at Ogilvie. The first sowing time of Pioneer 43Y23RR was on 29 April and we established about 90% of the target plants. The second sowing time was 16 May when conditions were actually drier and less favourable than the April sowing, and consequently we only established around 40% of our target plants. The resown plots were in offset rows and only just tickled in, to reduce damage to the earlier sown plants.

This was not as successful as sowing normally at that time, due to the dry conditions and only 13% of the target plants emerged, and no extra yield was produced.

As expected, the April sown plots out yielded plots sown in May, at every comparable plant density (Figure 2). April plots that had only 5-10 plants/m² produced equal or higher yields than later sown plots at higher densities.

Over a number of years in DPIRD trials we have seen RR canola produce 60-80% of maximum yield at around 5 plants/m² and 80-90% at 10 plants/m². For example Hyola® 404RR sown on 17 April, at five plants/m² at Salmon Gums in 2013, yielded 80% of the maximum (see photograph).

Sticking with low plant numbers sown early appears to be an acceptable approach, in terms of yield. However weed control may be compromised at these low densities. For example in our DPIRD plant density trial at the Liebe site in 2013 we observed more ryegrass spikes in TT canola when the crop density was below 20 plants/m² whilst in the RR hybrid plots we found no effect of plant density on ryegrass numbers (Figure 4). This indicates that if you have a competitive variety such as RR hybrids and effective herbicides such as glyphosate then low crop densities are less of an issue than less competitive crops such as TT canola combined with a less effective herbicide system.
Timing of nitrogen for lower rainfall canola in Western Australia
Mark Seymour and Sally Sprigg, DPIRD

Background
Farmers growing canola in lower rainfall areas usually aim to have a low risk cropping program. One way to reduce risk is to reduce inputs. Some inputs such as weed and insect control are often mandatory, while fertiliser inputs are often considered optional or are matched to target yields which may vary from year to year. At a cost of $1-$1.50/kg, nitrogen (N) is a major input cost and delaying the decision on how much N to apply until later in the year may allow growers to have a better assessment of yield potential of their crop, and if the seasonal outlook is poor, perhaps reduce the rate of N applied.

To assist WA farmers in low and medium rainfall areas making decisions on N inputs, we conducted 15 experiments from 2012-2014 to assess the response of canola to N and to determine if the timing of N could be delayed in WA until later in the growing season. In most experiments five rates of N were tested ranging from either 0-75, 0-100, or 0-150 kg N/ha. Nitrogen was applied at four different times (seeding, four weeks after sowing (WAS), green bud – early stem elongation at eight WAS or early flowering at 12 WAS) or split between these timings.

Figure 1 Sequence of photos taken at Salmon Gums in 2013 showing the same Hyola® 404RR plots. (a) 19 June, eight weeks after sowing Plot 3008 on the right is yet to get any N, (b) 15 July, 12 weeks after sowing Plot 3008 has just received 25kg N/ha, (c) 10 days later (d) at harvest – similar yields and oil
Key messages – timing of nitrogen

- Surveying farmers throughout WA over recent years indicated that the majority of farmers apply a proportion of their N at seeding and then apply extra (‘top-up’) N at 6-8 weeks after sowing (WAS).
- We found applying N at seeding, during the early vegetative stage (4WAS) and about the time of stem elongation (8WAS) produced similar seed yields.
- We also found that in the majority of instances applying top-up N around the time of the commencement of flowering (12WAS) produced similar seed yield responses to earlier timings.
  - On occasion delaying N until 12 weeks reduced seed yield or reduced oil levels, however we found these reductions were not large enough to reduce gross margins.
  - Reduced oil and seed yield levels with application of N at 12 weeks were more likely if low or no nitrogen was applied at seeding and then high rates of N (>50kg N/ha) were applied in a single application.
- Therefore we suggest growers continue to aim to apply top-up N at eight weeks, but if conditions are uncertain applying top-up N at 12 weeks may be a viable strategy. The extra time would allow farmers to be better informed about the likely performance of their crop, and in poor conditions allow them to reduce or eliminate further inputs.

Figure 2 Relationship between fertiliser N and total available nitrogen from soil, plant residue and fertilisers and the seed yield (t/ha), oil concentration in seed (%) and gross margin of canola at Salmon Gums in 2013