The canola complex – desirable traits for high rainfall cropping

Aaron Vague[1], Penny Riffkin[2], Irma Grimmer[2] and Jamie Smith[2]

[1]Southern Farming Systems (SFS)
[2]Agriculture Victoria Research (AVR)

Key messages

- There was a wide range in crop maturities with up to 50 days difference in date of first flower
- Several lines had flowering dates which fell between the commercially available spring and winter types
- Yields of up to 7 t/ha were achieved at Inverleigh and 6.6 t/ha at Hamilton
- Many of the lines not commercially available to growers outperformed the commercial varieties
- Lines with mid-season maturities may be suited to a wide range of locations in the HRZ

Key words: winter canola, spring canola, intermediate maturity

BACKGROUND

In more than seven years of field experiments at Hamilton, winter canola types have often out-yielded spring types with yields up to 8 t/ha. This was despite the winter types flowering later than the spring types (on average 35 days for the earlier sowing times) and in the last seven years, spring rainfall has often being considerably lower than the long-term average.

There are very few lines commercially available that have a maturity falling between the spring types and winter types. This experiment aims to identify additional lines with maturity between the spring and winter types by evaluating new canola lines not commercially available to growers which were supplied by six seed companies. Many of the lines have an intermediate maturity and may have a good fit for areas in the HRZ that are considered marginal for the winter types. In 2016 the lines were evaluated over more locations than presented in this report which presents results for Inverleigh and Hamilton only.

METHOD

A total of 19 canola lines were sown at Inverleigh on 30 April 2016 and 21 lines at Hamilton on 5 May. The lines included 15 (16 for Hamilton) lines not commercially available to growers and five commercial control varieties: Hyola577, Hyola970, Edimax, Archer and 45Y91. The trial at Inverleigh was sown by SFS on the Inverleigh trial site using a cone seeder on 178 mm row spacings with knifepoint and press-wheels. Plot size was 10 m long and 1.43 m with 8 rows. Plants were sown based on seed size to a target plant density of 50 plants/m2. The trial was sown with 100 kg/ha of MAP with a further 100 kg/ha of Gran Am applied on 30 May when the plants were at the 4-5 leaf stage. In crop nitrogen was supplied in the form of urea at 150 kg/ha applied to the whole trial on July 27, followed by another 150 kg/ha at first flower as dictated by the maturity of the treatments. Ruster was applied at a rate of 1 L/ha and incorporated at sowing.

At Hamilton, the trial was sown on May 5 with 100 kg/ha of MAP fertiliser treated with Impact Hi-load Gold fungicide at 200 ml/ha. On June 20, the trial was sprayed with 300 ml/ha of Lontrol, 100 ml/ha of Firepower, 350ml/ha of Clethodim, 500ml/ha of Pyrinex Super, and 1L/100L of Kwicken to control broadleaf weeds, grass weeds and insect pests. Prosaro was applied on August 29 at a rate of 450 ml/ha. Urea was applied at the bud visible stage of each line at a rate of 163 kg/ha (75 kg/ha of N).

At both sites the dates to bud visible, first flower, end of flower and final harvest were recorded. At final harvest, individual lines were hand harvested when seed colour was between 40 and 60% brown/black. Two cuts, each 1 m2, were taken per plot

RESULTS

There was a large variation in plant phenology over the trials (Figure 1). Many of the early season varieties had a long phase from green bud to first flower due to the cold winter conditions at the time of year. Varieties took between five to seven weeks to reach windrow timing after flowering had finished.

Trt	Maturity	M				J				J				A				S				O				N				D			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
AN13R2286	Early																																
45Y91	Early																																
Hyola635	Early																																
Hyola577	Early																																
CSCH03	Early																																
AN13R2282	Mid																																
AN16R2024	Mid																																
CHCH01	Mid																																
VictoryV7001CL	Mid																																
K50054	Mid																																
K50055	Mid																																
K50057	Mid																																
K50056	Mid																																
K50058	Mid																																
AGF484	Late																																
AGF437	Late																																
AGFV316OL	Late																																
Edimax	Late																																
Hyola970	Late																																
		GS 3.3																GS 4.1				GS 5.0				GS 6.4							

Figure 1. Key plant maturity date of early mid and long season canola lines at Inverleigh. Key growth stages include flower bud visible from above 'green bud' (GS 3.3), first flowers opened (GS 4.1), end of flowering (GS 5.0), most seed green-brown (GS 6.4)

Table 1. Dates of start of flowering for lines sown at Inverleigh and Hamilton in 2016. Lines were sown on April 30 at Inverleigh and May 5 at Hamilton.

Line	Inverleigh	Hamilton
45Y91	15-Aug	25-Aug
AGF 436		5-Oct
AGF 437	4-Oct	3-Oct
AGF 484	4-Oct	29-Sep
AGF V316 OL	4-Oct	29-Sep
AN13R2282	22-Aug	5-Sep
AN13R2286	15-Aug	25-Aug
AN16R2024	25-Aug	5-Sep
Archer		5-Sep
CSCH01	31-Aug	14-Sep
CSCH03	22-Aug	5-Sep
Edimax	4-Oct	8-Oct
Hyola577	19-Aug	25-Aug
Hyola635	15-Aug	25-Aug
Hyola970	4-Oct	8-Oct
K50054	7-Sep	19-Sep
K50055	30-Aug	16-Sep
K50056	8-Sep	18-Sep
K50057	7-Sep	16-Sep
K50058	8-Sep	21-Sep
Victory V7001CL	28-Aug	5-Sep

The difference in flowering dates between the lines was up to 50 days (Table 1). The earliest lines to flower were 45Y91, AN13R2286 plus Hyola635 at Inverleigh (15 August) and Hamilton (25 August). Most of the earlier lines spent between seven to eight weeks flowering. The later flowering lines included the winter types Edimax, Hyola970, AGF437, AGF436, AGF484 and AGFV316 OL. The later maturing varieties spent approximately five weeks flowering.

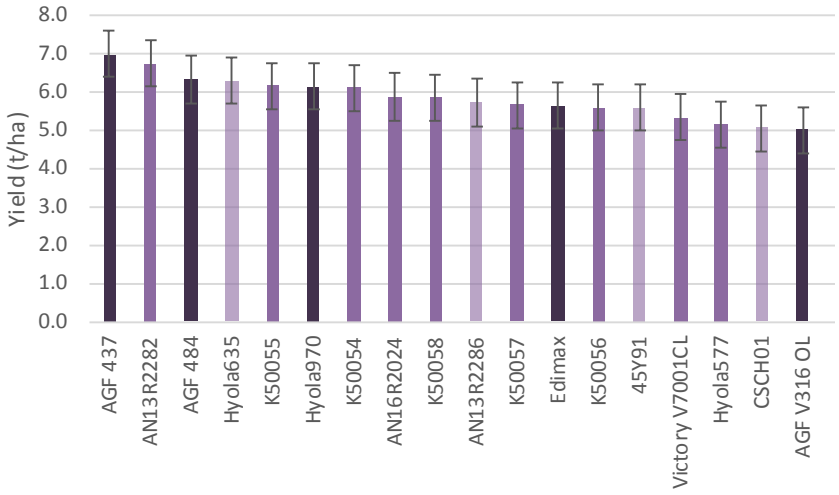

Figure 2. Mean grain yield (t/ha at 6% moisture) at Inverleigh 2016. LSD (p=0.05) = 1.21 t/ha (Early maturing line – light orange , Mid maturing line – orange bar, Late maturing line – brown)

At Hamilton, the mean grain yield was 5.5 t/ha ranging between 3.1 t/ha and 6.6 t/ha (figure 3). There is a strong yield correlation between the same varieties at the Inverleigh and Hamilton sites

DISCUSSION

Finding the canola variety that is going to best perform in a high rainfall climate is a battle that occurs every year. What performs best in one year might not follow through on expectations in the following season. The 2016 season was one of the softest finishes to be seen in a long time which favours the indeterminate flowering nature of canola. If the varieties avoid the effects of waterlogging at their key critical growth stages, then they have had the capacity to reach their full yield potential.

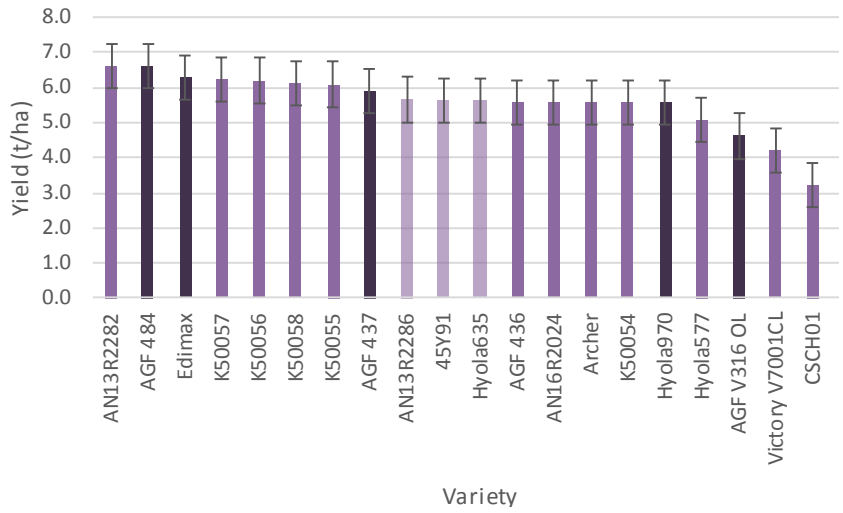

Figure 3. Mean grain yield (t/ha at 6% moisture) at Hamilton 2016. LSD (p=0.05) = 1.27 t/ha (early maturing line - light purple, mid maturing line - purple, late maturing line - dark purple)

If there was ever going to be a year for winter type canola to keep its promise on high yields in the south-west, then this was the year. This did prove to be the case, however the varieties considered to be early and mid-season lines continued to keep pace and outperform their long season counterparts. This was primarily due to the extended flowering time the earlier maturing varieties could sustain in the favourable conditions. The high yielding early maturing lines such as the Hyola635 made the most of the soft spring and continued to flower and set pods over an eight-week period from 15 August to 14 October. On the contrary, the winter type long season varieties such as AGF437 only flowered for five weeks and yielded just as well. The late maturing lines used their extended time in the vegetative stage to enhance their ability to set just as much seed at the end of the season. The trump card for the winter types and long season springs is the ability to get the seeder in the paddock earlier. However, with the break only arriving in mid-May this year it proved difficult to deliver an early sowing time without compromising acceptable establishment numbers.

The lines provided by the seed companies showed a wide range in maturity. Lines performed similarly at both sites which indicates the lines being tested are equally suited to growing regions across southern Victoria. Despite the trial at Hamilton being sown on raised beds, this site suffered waterlogging which reduced yields. The site at Inverleigh was well drained and the season was favourable for growth with a wet, mild spring. Differences in the relative performance of individual lines at the two sites may have been due to differences in ability to tolerate waterlogging. Many of the non-commercial mid to late maturing lines performed well e.g. AN13R2282 and K50055. These lines also performed well at Hamilton in 2015 which was a very hot dry year; this suggests that these lines may have broad adaptability for the HRZ.

CONCLUSION

Each year we try to find another canola variety that is the latest and greatest, but realistically we need to understand why a cultivar sits on the top step of the podium. If we were to crown a champion for 2014-15 the key characteristics of that variety would be focused on drought tolerance and short season maturity. However, in a perfect season like 2016 the tables turn and desirability comes from disease resistance and waterlogging tolerance. In a high rainfall climate there is the need for specialist varieties. Long season winter types lines retain the title of highest yield potential, however they are often restricted by a late break or a cut off season. Early and mid-season varieties continue to prove they have the flexibility to adapt to what the season brings. Both choices have a fit, and if the weather cooperates, the rewards are there for the taking.

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