3.4.4 The performance of winter and spring European canola types in the HRZ - Lake Bolac, Inverleigh & Hamilton, Vic

Location:
SFS Lake Bolac, Inverleigh & Hamilton Research Sites

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Summary of findings:

- Six European cultivars including one with herbicide tolerance performed consistently well across all sites.
- A maximum grain yield of 5.38 t/ha was recorded from the European winter canola cultivar, CBI206 at Lake Bolac.
- Grain yields were similar across all 3 sites with the site mean of 4.37 t/ha at Inverleigh, 4.79 t/ha at Lake Bolac and 4.47 t/ha at Hamilton.
- High yielding cultivars varied considerably in maturity suggesting that these cultivars have traits other than phenology which are important in forming yield in this environment.
- Work will continue to identify these traits and determine the yield stability over a range of seasons and locations.

Background/Aim:
Late maturing European winter canola types have performed well in the High Rainfall Zone of southern Australia over the past few years. This is despite flowering up to 4 weeks later than the Australian spring types when sown in late April, early May, and conditions during grain fill being abnormally dry. The aim of this experiment was to evaluate longer season European winter and spring canola types for their suitability to the high rainfall regions of southern Australia. The performance of 14 cultivars imported from Europe was compared to 3 high performing Australian spring types at three sites in Victoria, Lake Bolac, Hamilton and Inverleigh.

Rainfall:

Avg. Annual:	Lake Bolac – 539.7, Inverleigh – 547.6, Hamilton DPI 686.7 mm
Avg. G.S.R.:	Lake Bolac – 400.5 –, Inverleigh – 407.4, Hamilton DPI 537.6 mm
2011 Total:	Lake Bolac – 595.4, Inverleigh – 595.1, Hamilton DPI 980.6 mm
2011 G.S.R.:	Lake Bolac – 347.4, Inverleigh – 376.7, Hamilton DPI 622.6 mm

Variety: Australian controls - Hyola 50, 46Y83, JardeeTT
European types – Taurus, CBW1, CBW2, CBW3, CBI206, CBIW208, CBIW8006CL, CBI8004, CBI8001, CBI8802, CBI2610, CBI1709, CBI1609, CBI2109

Sowing rate: 50 plants per m2

Sowing date: Lake Bolac May 9, Hamilton 29 April, Inverleigh May 15

Fertiliser: All sites were sown with 100 kg/ha of MAP
At Lake Bolac and Inverleigh, 75 kgN/ha was applied at the bud visible stage with a further 69 kgN/ha in the form of urea on August 24 (Lake Bolac) and on August 19 at Inverleigh.
At Hamilton 75 kgN/ha was applied as urea post sowing with a further 75 kgN/ha applied as urea (54 kgN/ha) and sulphate of ammonium (21 kgN/ha) at the bud visible stage.

Plot size: Dimensions 9.5m x 1.45m on the flat (Lake Bolac and Inverleigh), 15m x 1.2m raised beds (Hamilton).

Measurements: grain yield, dates to bud visible, flowering and maturity, plant height, oil and disease.

Diseases: Powdery mildew, alternaria, sclerotina and blackleg were detected.

Tillage type: At Lake Bolac and Inverleigh the trials were sown with the new SFS cone seeder on 20cm row spacings using 2.5cm knifepoints. At Hamilton the trial was sown with a plot cone seeder on 15 cm row spacings using narrow knifepoints. Stubble was burnt prior to sowing at all three sites.

Herbicide	
Lake Bolac	
9-May-11	Trifluralin 3L/ha, Roundup DST 2.3L/ha
11-May-11	Dual Gold 500mls/ha, Lorsban 700mls/ha
17-Jun-11	Liase 1L/ha, Select 500 ml/ha, Hasten 1L/ha
27-Jun-11	Lontrel 300mls/ha, Deluge 100mls/ha
1-Sep-11	Liase 1L/ha, Select 500ml/ha, Hasten 1L/ha
Inverleigh	
15-May-11	Trifluralin 3L/ha, Roundup DST 2.3 L/ha
17-May-11	Dual Gold 400ml/ha
Hamilton	
27-Apr-11	Roundup Powermax 2L/ha, Hammer 75mls/ha
29-Apr-11	Dual Gold 200 mls/ha
6-Jun-11	Lontrel 300 mls/ha
1-Jul-11	Select 500 mls/ha, Hasten 1L/ha
Fungicide	
Lake Bolac	
27-Jun-11	Prosaro 425ml/ha, Hasten 1L/ha
Insecticide	
Lake Bolac	
09-May-11	Metarex 5kg/ha
19-May-11	Talstar 40ml/ha, Lorsban 2L/ha
10-Jun-11	Metarex 5kg/ha
29-Jun-11	LeMat 120ml/ha
22-Nov-11	LeMat 200ml/ha
Inverleigh	
16-May-11	Metarex 5kg/ha
17-May-11	Lorsban 700ml/ha
6-Jun-11	Lorsban 2L/ha, Talstar 40ml/ha, Metarex 4kg/ha
14-Nov-11	Pirimor 500g/ha
Hamilton	
29-Apr-11	Fastac Duo 100ml/ha
15-Jul-11	Talstar 100EC 200ml/ha
4-May-11	Metaldehyde pellets
16-May	Metaldehyde pellets

Paddock History	
Lake Bolac	
2009:	Canola
2010:	Wheat
Inverleigh	
2009:	Wheat
2010:	Barley
Hamilton	
2009:	Field peas
2010:	Wheat
Soil Characteristics	
Lake Bolac	
Soil Type:	Brown clay loam
pH (1:5 CaCl):	6.6
Deep N (kg/ha):	**45.7**
P (Colwell) (mg/kg):	44
K (Colwell) (mg/kg):	430
Organic Carbon %:	1.8
Inverleigh	
Soil Type:	Sandy loam
pH (1:5 CaCl):	6.2
Deep N (kg/ha):	33.6
P (Colwell) (mg/kg):	91
K (Colwell) (mg/kg):	300
Organic Carbon %:	1.2

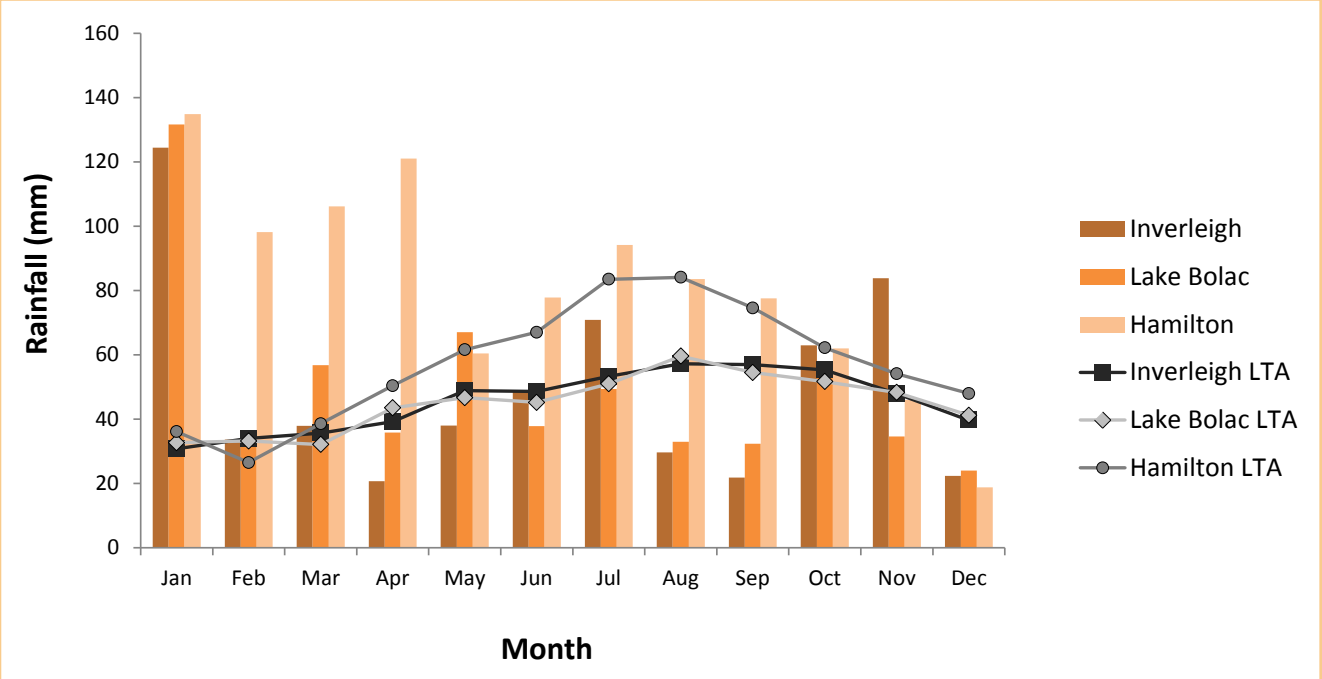
Image 1. The difference in maturity between the European and Australian varieties at the Inverleigh site

Results and discussion:

Climate

Annual rainfall for 2011 was higher than the long term average (LTA) at all sites largely due to rainfall in January being approximately 4 times greater than the LTA. Annual rainfall at Hamilton was nearly 300 mm more than the LTA with growing season rainfall (GSR) 85 mm higher. Raised beds mitigated much of the waterlogging at this site but excess water may have reduced grain yields. Despite the higher than average annual rainfall, GSR was lower than the LTA at Lake Bolac (53 mm less) and Inverleigh (31 mm less) due mainly to lower rainfall in August and September (Figure 1).

Figure 1. Monthly rainfall at Inverleigh, Lake Bolac and Hamilton in 2011 compared to the long term average rainfall (lines) at Inverleigh, Lake Bolac and Hamilton.



Crop Phenology

There was a wide in range in phenology between the 17 cultivars with up to 43 days difference to the bud visible stage, 38 days difference to flowering and 35 days difference to maturity (Table 1).

Table 1. Dates of bud visible, flowering and harvest of 17 cultivars at 3 sites in 2011. The trial includes 14 spring and winter types from Europe and 3 spring controls (Hyola 50, 46Y83 and JardeeTT) from Australia. Trials were sown on May 9 at Lake Bolac, May 15 at Inverleigh and April 29 at Hamilton.

	Lake Bolac			Inverleigh			Hamilton		
Cultivar	**Bud Visible**	**Flowering (50%)**	**Harvest**	**Bud Visible**	**Flowering (50%)**	**Harvest**	**Bud Visible**	**Flowering (50%)**	**Harvest**
46Y83 (CL)	4-Aug	6-Sep	17-Nov	4-Aug	5-Sep	8-Nov	20-Jul	26-Aug	7-Nov
CB1	14-Sep	4-Oct	5-Dec	15-Sep	9-Oct	7-Dec	28-Aug	26-Sep	2-Dec
CB2	5-Sep	1-Oct	5-Dec	14-Sep	3-Oct	2-Dec	26-Aug	27-Sep	2-Dec
CB3	1-Sep	26-Sep	5-Dec	5-Sep	28-Sep	2-Dec	24-Aug	13-Sep	25-Nov
CBI 206	5-Sep	30-Sep	5-Dec	5-Sep	1-Oct	2-Dec	24-Aug	22-Sep	2-Dec
CBI 8802	4-Aug	6-Sep	22-Nov	4-Aug	5-Sep	16-Nov	23-Jul	26-Aug	18-Nov
CBI1609	20-Aug	17-Sep	28-Nov	26-Aug	20-Sep	24-Nov	11-Aug	10-Sep	21-Nov
CBI1709	20-Aug	22-Sep	28-Nov	26-Aug	20-Sep	24-Nov	12-Aug	11-Sep	21-Nov
CBI2109	21-Aug	18-Sep	28-Nov	26-Aug	20-Sep	24-Nov	10-Aug	6-Sep	21-Nov
CBI2610	20-Aug	18-Sep	28-Nov	26-Aug	20-Sep	24-Nov	9-Aug	6-Sep	21-Nov
CBI8001	5-Sep	27-Sep	5-Dec	5-Sep	30-Sep	7-Dec	24-Aug	21-Sep	1-Dec
CBI8004	30-Aug	3-Oct	5-Dec	15-Sep	4-Oct	7-Dec	22-Aug	28-Sep	4-Dec
CBIW 208	14-Sep	7-Oct	7-Dec	18-Sep	7-Oct	13-Dec	31-Aug	3-Oct	8-Dec
CBIW8006CL	5-Sep	1-Oct	5-Dec	14-Sep	7-Oct	7-Dec	24-Aug	23-Sep	2-Dec
Hyola 50	4-Aug	6-Sep	17-Nov	4-Aug	5-Sep	8-Nov	22-Jul	26-Aug	7-Nov
Jardee TT	6-Aug	10-Sep	17-Nov	4-Aug	8-Sep	8-Nov	22-Jul	26-Aug	7-Nov
Taurus	5-Sep	1-Oct	5-Dec	9-Sep	4-Oct	2-Dec	24-Aug	25-Sep	1-Dec

Grain Yields

Grain yields ranged from 3.05 t/ha for JardeeTT at Inverleigh to 5.38 for CBI206 at Lake Bolac (Table 2). Overall mean grain yields were similar at each site with 4.37 t/ha at Inverleigh, 4.79 t/ha at Lake Bolac and 4.47 t/ha at Hamilton. At Inverleigh grain yields from CB1, CB2, CBI1709, CBI206, CBI2109, CBI2001, CBI8802, Taurus and the herbicide tolerant cultivar CBIW8006CL were significantly higher than the three Australian cultivars. At Lake Bolac CBI206, CBI8001 and CBIW8006CL out performed the Australian cultivars. At Hamilton JardeeTT and 46Y83 yielded significantly lower than all cultivars with the exception of CB2, CBI1609. The top performing cultivars across all sites in 2011 included CBIW8006CL, CBI8001, CB1, CBI206 and CBI1709. Results from multi trial analysis across 6 sites and 2 years (2010 and 2011) showed CB1, CBI1709, CBI206, CBI8001, CBI8802 and CBIW6006CL to yield significantly more than the best performing Australian cultivars (Table 2). High yielding cultivars ranged markedly in phenology with differences of up to 40 days to bud visible, 31 days to flowering and 16 days to harvest suggesting that characteristics other than phenology are influencing grain yields in these European cultivars.

Table 2. Grain yields (t/ha) of 14 winter and spring cultivars from Europe and 3 spring Australian controls (Hyola 50, 46Y83 and JardeeTT) at Lake Bolac, Inverleigh and Hamilton in 2011. Multi trial data gives the combined average grain yields from 2 sites in 2010 (Hamilton and Lake Bolac) and 4 sites in 2011 (Hamilton, Lake Bolac, Inverleigh and Naracoorte). Not all cultivars were sown in 2010.

Cultivar	Inverleigh	Lake Bolac	Hamilton	Multi Trial
46Y83 (CL)	3.57	4.31	3.27	4.02
CB1	4.61	5.02	5.25	4.72
CB2	4.54	4.82	3.83	4.68
CB3	4.16	4.95	4.40	4.43
CBI1609	4.33	4.96	4.04	4.49
CBI1709	4.55	5.02	4.90	4.70
CBI206	4.91	5.38	4.40	4.80
CBI2109	4.84	4.28	5.32	4.63
CBI2610	4.18	4.45	4.95	4.37
CBI8001	5.13	5.22	4.88	5.08
CBI8004	4.05	5.06	4.42	4.40
CBI8802	4.74	5.00	4.68	4.71
CBIW208	4.22	5.02	4.30	4.51
CBIW8006CL	4.97	5.22	5.21	5.04
Hyola50	3.86	4.48	4.49	4.27
JardeeTT	3.05	3.43	3.18	3.29
Taurus	4.53	4.85	4.56	4.47
F Prob	*<0.001*	*<0.001*	*<0.001*	*<0.001*
lsd	*0.667*	*0.702*	*0.931*	*0.420*

Summary:

Results indicate that there are a number of European cultivars, including one with herbicide tolerance that have the potential to improve grain yields above the Australian cultivars currently available to growers. High yielding cultivars varied considerably in maturity suggesting that these cultivars have traits other than phenology which are likely to be contributing to grain yield in this environment. Work will continue to identify these important traits and determine the stability of these yields over a wider area and in different seasons.