Quality of Australian Canola 2005

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Acknowledgments

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Introduction

Sample Analysis

Canola samples representing the 2005 harvest were received from the bulk handlers in New South Wales, South Australia, Western Australia and Victoria. These samples are representative of the seed collected at each of their receival points and have been taken to cumulatively represent the Australian harvest. The Department of Primary Industries Oil Research Laboratory has no control over the collection of the samples and all data given is based on the analysis of the samples provided.

Each sample was analysed for oil, protein and glucosinolate concentrations, fatty acid profiles and volumetric grain weights according to the standard AOF methods outlined in the methods section at the back of this book. The Department of Primary Industries Oils Research Laboratory in Wagga Wagga performed all analyses except oil and protein on the New South Wales, Victoria and Western Australia samples. Oil and protein contents were provided by Graincorp for the New South Wales and Victorian samples and Grainpool for the Western Australian samples. Oil and glucosinolate concentrations are reported at 6% moisture in whole seed and the protein is reported in oil – free meal at 10% moisture.

Breeding Trials

An excerpt of the 2005 trial results for the "National *Brassica* Improvement Project" funded by the Grains Research and Development Corporation has been included. The project involves trials of potential new cultivars at various sites across New South Wales, South Australia, Victoria and Western Australia. Yield and quality data are collected and used to evaluate a cultivar's performance under a range of conditions. The quality parameters analysed by the Oil Research Laboratory were oil, protein and glucosinolate concentrations. The quality results from one site from each state have been included to give an indication of the quality ranges for each cultivar. No yield data is published in this booklet.

Weather and Production review

The Season

For the third consecutive year, the 2005 growing season across Australia began with a variable start.

Following excellent autumn rain in April and May Western Australia experienced an almost perfect start to the growing season which enabled the crop to be sown on time. The favourable start also resulted in 5% increase in the area sown compared to the previous season with the biggest increase occurring in the higher rainfall zone around the Geraldton region. Good winter and spring rainfall and generally mild temperatures for most of the growing season, ensured near ideal growing conditions for crops in all canola areas resulting in Western Australia experiencing its best canola season in recent years with above average yields. Oil contents were also excellent with a final state average of 45%.
However, extremely dry conditions and failure of the autumn break resulted in the majority of crops not being sown until the seasonal break finally occurred in early June in South Australia and Victoria and mid June in New South Wales where 91% of the state was drought declared at the beginning of June. The very late break impacted on intended plantings with only a very small proportion of the expected crop being sown in the low rainfall zones and a reduced area in the higher rainfall zones in each of the states. In NSW the final area sown was only half of the area estimated to have been sown in the previous season whilst sowings in South Australia and Victoria were reduced by about 15% and 5% respectively.

Mild winter temperatures combined with above average rainfall across South Australia and the Eastern states enabled the majority of crops to establish well and make better than expected winter growth given the lateness of sowing. The late sowing also reduced the flowering period by up to two weeks in some districts in the Eastern states particularly in NSW. However, this was offset by unusually mild and favourable spring conditions which prolonged pod fill and delayed harvest but assisted in increasing the yield potential of crops in NSW and South Australia. Although oil contents were lower than normal in both states they were satisfactory given the late start to the season and the fact that many growers opted to reduce or not undertake their nitrogen topdressing program of canola crops.

Unfortunately, in Victoria crops in the usually high yielding western districts where a significant portion of the crop was grown in 2005 did not perform up to early expectations impacting on the overall performance of the state's canola crop. However, similar to NSW and South Australia oil contents were reasonable given the seasonal conditions experienced.

In all states the reported incidence of seedling diseases, especially blackleg, was very low. In NSW the wet conditions during flowering resulted in an increased incidence of sclerotinia in some districts, particularly on the eastern side of the south west slopes, with some reports of estimated yield losses of between 5 and 10%.

Although there were some isolated reports of insect pests such as red legged earth mite and lucerne flea, the general level of insect pest problems was also below normal throughout the winter in all states. Several districts in central NSW reported problems with heliothis caterpillars in crops during the late stages of pod fill with control

measures being required in some situations. A late outbreak of Rutherglen bug along the upper slopes districts in NSW caused initial concern in some crops but they did not require control and did not cause damage to crops.

Despite the difficulties experienced in NSW, South Australia and Victoria the 2005 canola crop finished better than expected. Final yields in all states were better than achieved in the previous season whilst oil contents in the eastern states were satisfactory given the late sowing. The Western Australia crop averaged one of its highest ever oil contents.

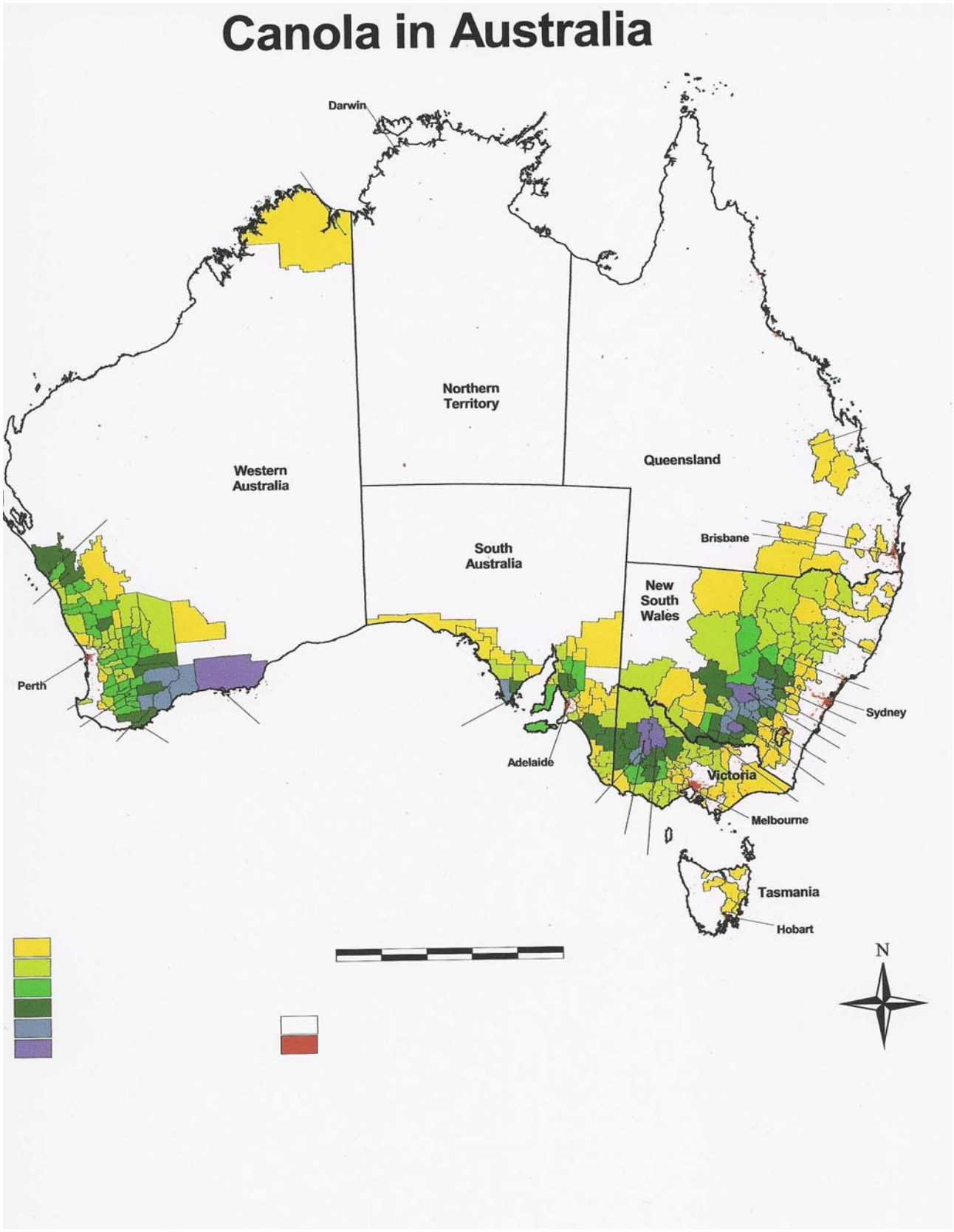

Figure 1 Areas of canola production in Australia

Published with approval of Biotechnology Australia

Yield

The 2005 canola harvest was slightly lower than 2004 with 1,438,750 tonnes harvested from 960,000 hectares across the country. The yield varied from a state average of 1.4 t/ha in Western Australia to 1.8 t/ha in New South Wales. The national yield of 1.5 t/ha was 0.1 t/ha higher than the 2004 average.

Table 1: Canola production in Australia by state 2005

State	Production (kilotonnes)	Area (kilohectares)	Average Yield (tonnes/hectare)
NSW	254	145	1.8
Victoria	338	225	1.5
SA	218	150	1.5
WA	630	440	1.4
Australia	1439	960	1.5

Source: AOF newsletter January 2006

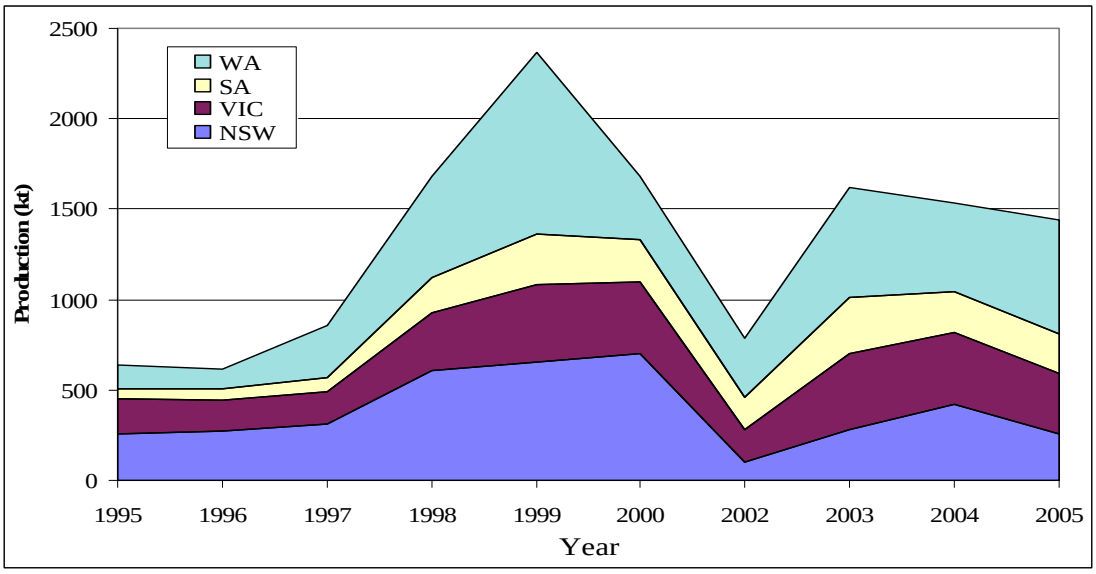

Figure 2: Canola Production in Australia 1995-2005

Australian Quality Parameter Summary

The division, state and Australian mean values for all analysis are calculated on the basis of the tonnage that each site represents. However, due to tonnages being confidential information, no individual site tonnages can be reported.

Table 2: Average quality data of Australian canola 2005

Quality Parameter	Australian Mean
Oil content, % in whole seed @ 6 % moisture	42.2
Protein content, % in oil-free meal @ 10 % moisture	36.3
Glucosinolates, µmoles/g in whole seed @ 6 % moisture	7
Volumetric grain weights, lbs/b	53.2
kg/hL	64.1
Oleic acid concentration (C18:1), % in oil	60.9
Linoleic acid concentration (C18:2), % in oil	19.9
Linolenic acid concentration (C18:3), % in oil	10.8
Erucic acid concentration (C22:1), % in oil	0.1
Saturated fatty acid concentration, % in oil	7.0
Iodine Value	116.2

Oil Content

The average oil content for the 2005 harvest was 42.2 %. This was 1 % higher than the 2004 harvest and the highest since 1996. Oil content ranged from a low of 36.5 % at Ardlethan in New South Wales to a high of 46.1 % at Borden in Western Australia.

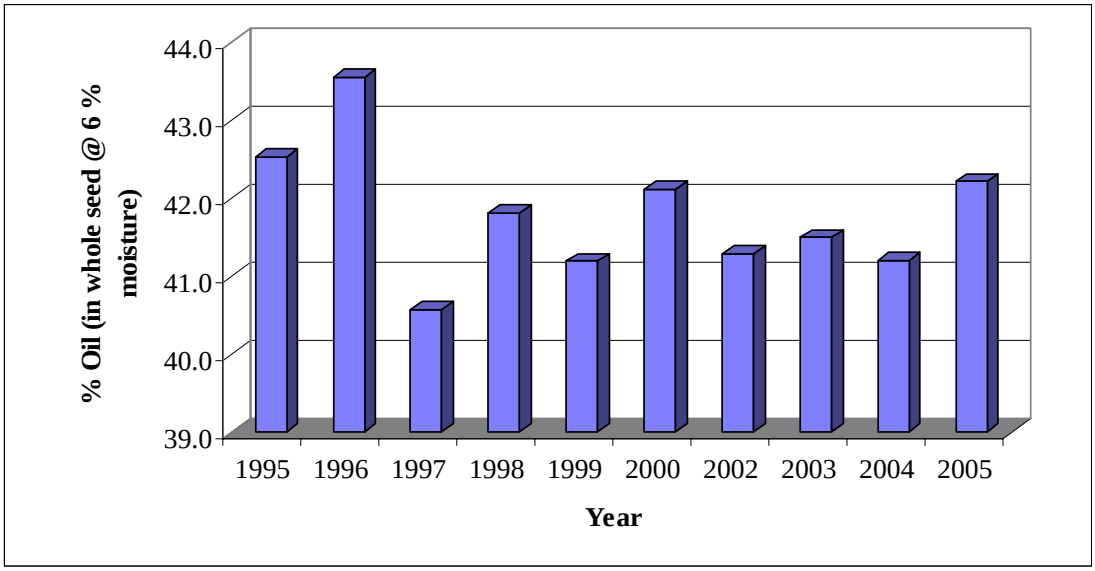

Figure 3: Average Australian oil content in canola 1995-2005

Protein Content

The average protein content for the 2005 harvest was 36.3 % in oil free meal. This was a decrease of 5.3 % from the 2004 harvest and the lowest since 1999. Protein content ranged from 32.1 % at Milbrulong in New South Wales to 40.2 % at Raywood in Victoria.

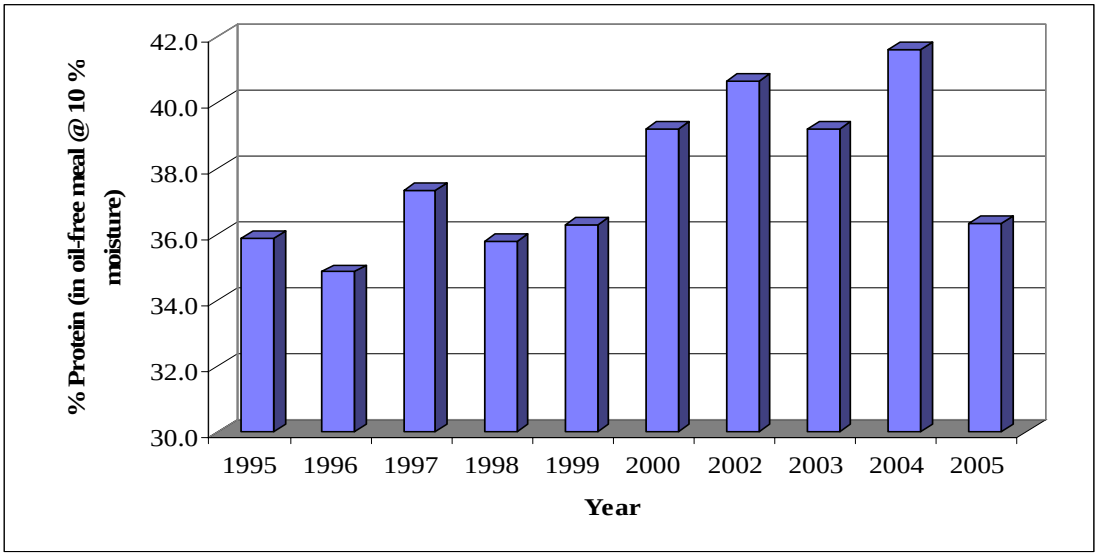

Figure 4: Average Australian protein content in canola meal 1995-2005

Glucosinolate Concentration

The average glucosinolate content for the 2005 harvest was 7 μmoles/g. This was a decrease of 3 μmoles/g from the 2004 harvest and the lowest since 1998. Glucosinolate content ranged from 3 μmoles/g at Pt Lincoln in Western Australia, Goroke in Victoria and Henty West in New South Wales to 12 μmoles/g at Moolort and Dunolly in Victoria and Harden in New South Wales.

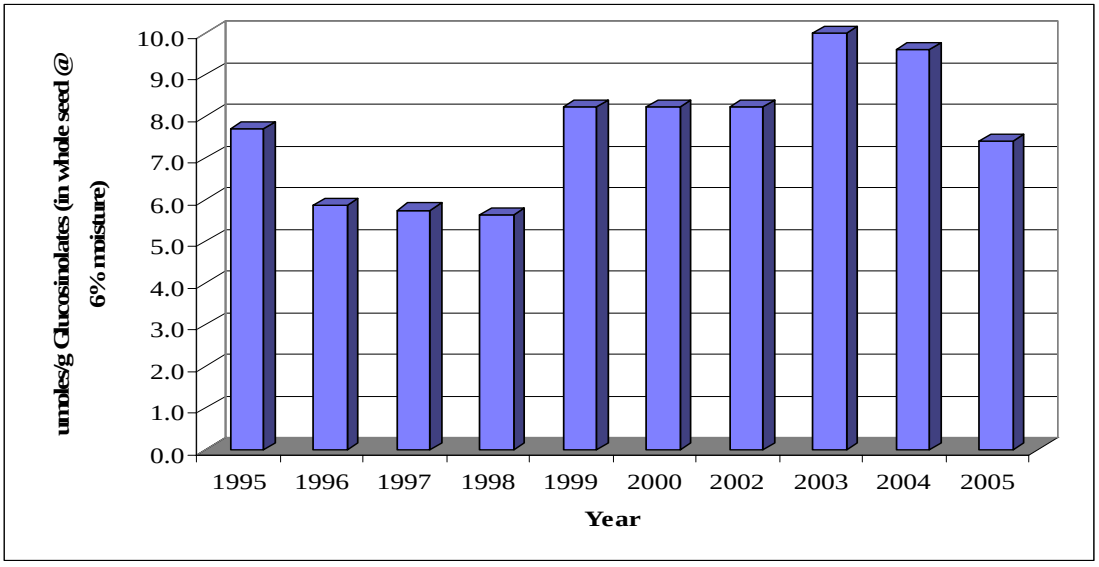

Figure 5: Average Australian glucosinolate concentration in canola 1995-2005

Fatty Acid Composition

Oleic Acid

The average oleic acid (C18:1) concentration in the oil produced from the 2005 harvest was 60.9 %. This was 0.6 % higher than 2004. The concentration ranged from 55.8 % at Northampton in Western Australia to 65.0 % at Red Bend in New South Wales.

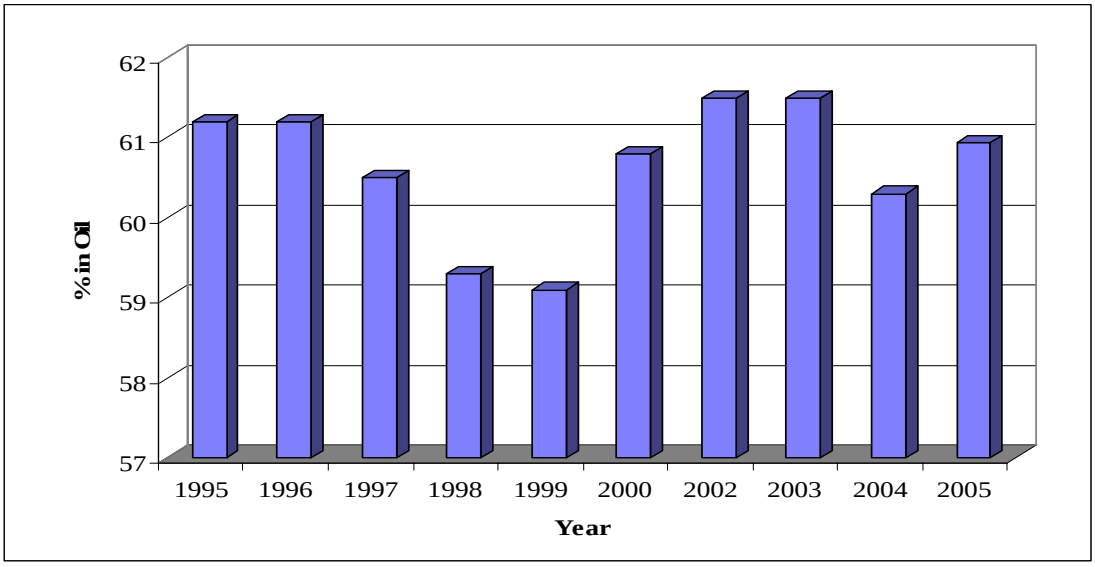

Figure 6: Average Australian oleic acid concentration in canola oil 1995-2005

Fatty Acid Composition

Linoleic Acid

The average linoleic acid (C18:2) concentration in oil produced from the 2005 harvest was 19.9 % this was a slight decrease compared to the past four years. The concentration ranged from 18.3 % at Wongarbon in New South Wales to 23.2 % at Northampton in Western Australia.

Linolenic Acid

There was a slight increase in the linolenic acid (C18:3) concentration to 10.8 %. This was the highest since 2000 and the third successive increase. Linolenic acid concentrations ranged from 7.8% & at Wyalong in New South Wales to 12.7 % at Northampton in Western Australia.

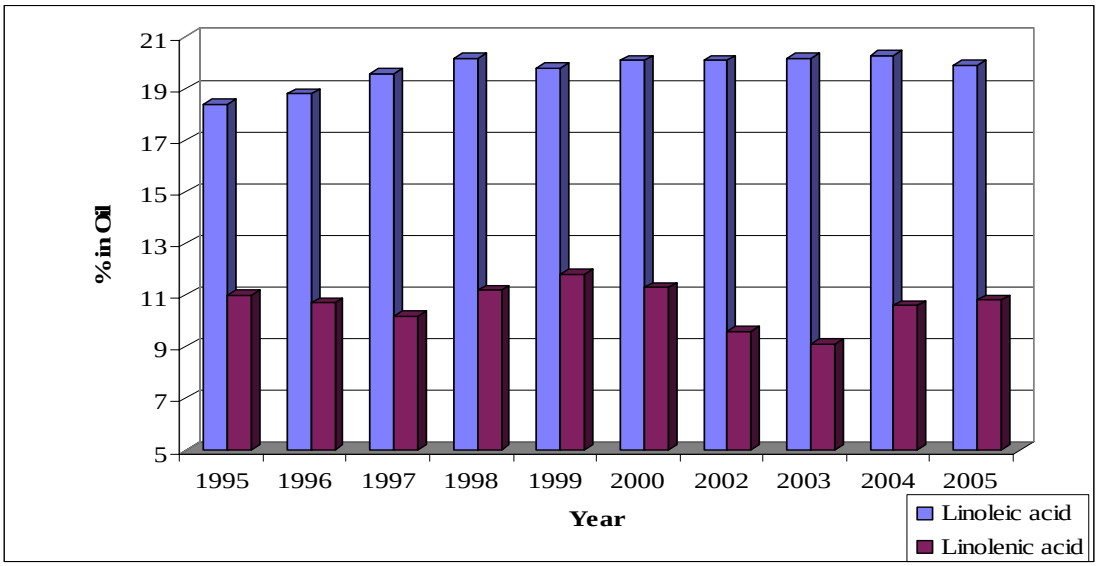

Figure 7: Average linoleic and linolenic acid concentrations in canola oil 1995-2005

Fatty Acid Composition

Saturated Fatty Acid

The average saturated fatty acid concentration was 7.0 %. This was a 0.3 % decrease from the 2004 harvest and the lowest since 1999. Saturated fatty acid concentration ranged from 6.7 % at Moora in Western Australia to 7.7 % at Wongarbon in New South Wales.

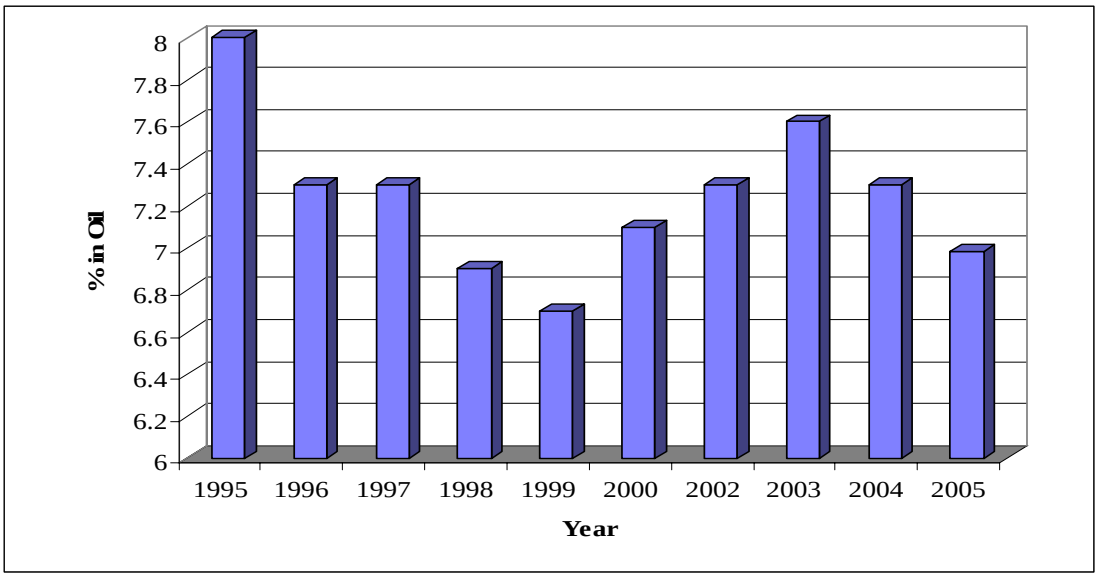

Figure 8: Average Australian saturated fatty acid concentration in canola oil 1995-2005

Quality Data by State

Quality Data- New South Wales

Table 3 Quality Data- New South Wales

Division/ Region/ Receival Site	[1] Oil	[2] Protein	[3] Glucosinolates µmoles/g	[4] Grain Weight lbs/b	kg/hL
Central					
Dubbo					
Mungeribar	39.5	38.8	8	53.8	67.0
Wongarbon	41.0	35.8	9	53.4	66.5
Parkes					
Bribbaree	41.4	33.1	9	53.0	66.0
Caragabal	39.9	35.0	4	52.1	65.0
Cowra	40.7	34.9	11	51.7	64.5
Greenethorpe	40.2	35.7	10	52.1	65.0
Milvale	42.5	33.2	8	52.6	65.5
Parkes Sub	41.6	37.5	9	53.4	66.5
Red Bend	39.8	39.6	7	53.8	67.0
Wagga Wagga					
Boorowa	42.7	33.5	6	52.1	65.0
Boree Creek	40.3	33.2	8	53.4	66.5
Coolamon	40.2	34.9	10	53.8	67.0
Cootamundra	42.1	33.4	4	52.1	65.0
Grong Grong	41.0	33.2	9	53.0	66.0
Harden	41.8	34.9	12	52.1	65.0
Henty West	41.2	33.9	3	52.1	65.0
Junee Sub	41.5	34.6	9	53.0	66.0
Maimuru	41.6	35.8	7	52.1	65.0
Milbrulong	41.0	32.1	10	53.4	66.5
Rand	42.0	32.3	9	53.0	66.0
Stockinbingal	41.8	33.1	7	52.6	65.5
The Rock	41.2	34.1	10	52.1	65.0
Wyalong					
Ardlethan	36.5	33.8	8	54.2	67.5
Barellan	41.2	32.9	5	51.7	64.5
Temora Sub	41.6	33.1	6	52.6	65.5
Wyalong	40.3	34.1	7	53.4	66.5
Central Mean	**41.0**	**34.6**	**8**	**52.8**	**65.8**
Northern					
Narrabri					
Premer	41.3	38.1	7	52.6	65.6
Ulamambri	40.9	38.1	6	52.1	65.0
Northern Mean	**41.1**	**38.1**	**6**	**52.4**	**65.3**
NSW Mean	**41.0**	**36.4**	**7**	**52.6**	**65.5**

[1] % in whole seed @ 6 % moisture, [2] % in oil free meal @ 10 % moisture, [3] µmoles/g in whole seed @ 6 % moisture

[4] Volumetric Grain Weights- lbs/b: Pounds per bushel, kg/hL: Kilograms per hectolitre

Quality Data- Victoria

Table 4 Quality Data- Victoria

Division/ Region/ Receival Sites	[1] Oil	[2] Protein	[3] Glucosinolates µmoles/g	[4] Grain Weight lbs/b	kg/hL
Southern					
Horsham					
Berrybank	41.7	36.8	10	50.9	63.5
Beulah St	39.9	37.9	9	53.8	67.0
Carpolac	42.2	37.0	9	53.4	66.5
Goroke	42.2	36.9	3	53.8	67.0
Hamilton	43.8	35.4	8	52.6	65.5
Horsham	40.6	37.4	8	53.8	67.0
Laharum	40.8	36.7	8	53.8	67.0
Lillimur	42.9	36.2	9	54.2	67.5
Lubeck	40.5	40.2	7	53.4	66.5
Marmalake	40.7	37.9	9	52.6	65.5
Naracoorte	41.5	38.1	8	52.6	65.5
Natimuk	41.2	36.5	5	53.8	67.0
Nhill	41.1	35.0	8	53.8	67.0
Rainbow	39.6	38.0	7	54.6	68.0
Skipton	40.2	37.5	11	51.7	64.5
Warracknabeal	38.4	39.4	11	53.4	66.5
Westmere	42.1	34.5	9	53.4	66.5
Willaura	41.5	36.1	9	52.6	65.5
Yanac	40.9	36.8	9	INS	INS
Marong					
Borung	40.6	36.7	8	53.4	66.5
Cope Cope	39.7	38.8	8	53.0	66.0
Deniliquin	41.9	35.3	8	53.8	67.0
Dookie St	41.4	37.6	10	52.6	65.5
Dunolly	40.7	36.1	12	51.7	64.5
Echuca	42.4	35.9	8	54.2	67.5
Elmore	40.5	38.0	10	52.6	65.5
Mitiamo	40.7	38.1	9	54.2	67.5
Moolort	39.2	39.9	12	52.6	65.5
Murchison East	41.9	36.4	7	53.0	66.0
Oaklands	41.4	37.8	8	53.4	66.5
Raywood	41.3	40.2	10	51.7	64.5
Sanger	41.7	38.5	8	53.0	66.0
St James	43.4	34.2	9	53.8	67.0
Tocumwal	41.3	35.0	9	53.8	67.0
Wangamong	42.7	34.4	5	53.8	67.0
Yarrawonga	42.3	35.5	9	53.0	66.0
Swan Hill					
Birchip	38.1	39.2	6	54.2	67.5
Quambatook	38.2	38.3	7	54.6	68.0
Swan Hill	41.7	34.4	7	54.6	68.0
Vic Mean	**41.5**	**36.6**	**9**	**52.9**	**65.9**

[1] % in whole seed @ 6 % moisture, [2] % in oil free meal @ 10 % moisture, [3] µmoles/g in whole seed @ 6 % moisture

[4] Volumetric Grain Weights- lbs/b: Pounds per bushel, kg/hL: Kilograms per hectolitre

INS- Insufficient sample provided to perform test

Quality Data- South Australia

Table 5 Quality Data- South Australia

Division/ Region/ Receival Site	**[1] Oil**	**[2] Protein**	**[3] Glucosinolates µmoles/g**	**[4] Grain Weight lbs/b**	**kg/hL**
Andrews	42.1	36.9	8	53.0	66.0
Ardossan	40.5	36.0	4	53.8	67.0
Bowmans	41.4	38.1	8	53.8	67.0
Coomandook	41.8	37.3	7	53.0	66.0
Cummins	41.4	36.2	6	52.1	65.0
Keith	41.6	37.5	7	53.0	66.0
Kingscote	44.2	36.5	7	53.0	66.0
Port Adelaide	40.6	36.7	7	52.1	65.0
Port Lincoln	42.2	36.2	3	54.2	67.5
Roseworthy	41.7	37.5	5	53.8	67.0
Tailem Bend	43.0	36.7	5	53.8	67.0
Wolseley	41.2	37.2	8	53.8	67.0
SA Mean	**41.6**	**36.9**	**6**	**53.3**	**66.4**

[1] % in whole seed @ 6 % moisture, [2] % in oil free meal @ 10 % moisture, [3] µmoles/g in whole seed @ 6 % moisture

[4] Volumetric Grain Weights- lbs/b: Pounds per bushel, kg/hL: Kilograms per hectolitre

Quality Data- Western Australia

Table 6 Quality Data- Western Australia

Division/ Region/ Receival Site	[1] Oil	[2] Protein	[3] Glucosinolates µmoles/g	[4] Grain Weight lbs/b	kg/hL
Albany					
Borden	46.1	35.0	9	54.2	67.5
Broomehill	45.1	37.2	7	54.2	67.5
Gairdner	46.1	36.2	4	53.8	67.0
Esperance					
Beaumont	45.7	36.6	7	53.4	66.5
Cascades	44.9	39.7	6	53.8	67.0
Lake Varley	45.0	36.1	9	54.2	67.5
Geraldton					
Northampton	43.4	39.4	5	55.4	69.0
Yuna	42.4	38.1	11	55.4	69.0
Kwinana					
Avon	44.8	38.2	8	55.0	68.5
Brookton	45.1	37.2	9	55.0	68.5
Kellerberrin	44.4	37.3	11	54.6	68.0
Moora	45.9	37.3	7	54.2	67.5
WA Mean	**44.9**	**37.4**	**7.7**	**54.4**	**67.8**

[1] % in whole seed @ 6 % moisture, [2] % in oil free meal @ 10 % moisture, [3] µmoles/g in whole seed @ 6 % moisture

[4] Volumetric Grain Weights- lbs/b: Pounds per bushel, kg/hL: Kilograms per hectolitre

Fatty Acid Composition by State

Fatty Acid Composition- New South Wales

Table 7 Fatty Acid Composition- New South Wales

Division/ Region/ Receival Site	14:0	16:0	16:1	18:0	18:1	18:2	18:3	20:0	20:1	22:0	22:1	24:0	24:1	[1] Sat.	[2] Iodine Value
Central															
Dubbo															
Mungeribar	0.1	4.4	0.3	1.9	62.0	19.9	9.7	0.4	0.8	0.2	0.0	0.1	0.1	7.1	114.1
Wongarbon	0.1	4.2	0.3	2.5	64.8	18.3	7.9	0.6	0.9	0.2	0.0	0.2	0.1	7.7	109.1
Parkes															
Bribbaree	0.1	4.4	0.3	2.1	63.0	19.4	9.0	0.5	0.9	0.2	0.1	0.1	0.1	7.3	112.2
Caragabal	0.1	4.5	0.3	2.1	63.9	19.1	8.2	0.5	0.9	0.2	0.0	0.1	0.1	7.5	110.4
Cowra	0.1	4.4	0.3	2.0	61.4	19.8	10.1	0.5	0.9	0.2	0.1	0.1	0.1	7.3	114.5
Greenethorpe	0.1	4.3	0.3	1.9	61.8	19.6	10.1	0.5	0.9	0.2	0.1	0.1	0.2	7.1	114.5
Milvale	0.1	4.2	0.3	2.1	62.8	19.4	9.4	0.5	0.9	0.2	0.1	0.1	0.1	7.2	113.1
Parkes Sub	0.1	4.2	0.2	2.1	64.1	18.8	8.5	0.5	0.9	0.2	0.1	0.1	0.1	7.1	111.1
Red Bend	0.1	4.2	0.3	2.1	65.0	18.4	8.0	0.5	0.9	0.2	0.1	0.1	0.1	7.2	109.7
Wagga Wagga															
Boorowa	0.1	4.2	0.3	1.9	61.3	19.3	10.9	0.5	1.0	0.2	0.2	0.1	0.1	7.0	115.7
Boree Creek	0.1	4.4	0.3	2.2	62.5	19.7	9.1	0.5	0.8	0.2	0.1	0.1	0.1	7.5	112.7
Coolamon	0.1	4.5	0.3	2.1	63.3	19.3	8.5	0.5	0.8	0.2	0.0	0.2	0.1	7.5	111.2
Cootamundra	0.1	4.3	0.3	1.9	60.8	20.0	10.7	0.5	1.0	0.2	0.1	0.1	0.1	7.0	115.9
Grong Grong	0.1	4.4	0.3	2.2	63.4	19.2	8.7	0.5	0.8	0.2	0.0	0.1	0.1	7.5	111.5
Harden	0.1	4.2	0.3	1.8	60.4	20.1	11.0	0.5	1.0	0.2	0.1	0.1	0.1	7.0	116.7
Henty West	0.1	4.2	0.3	1.8	61.2	19.7	10.8	0.5	0.9	0.2	0.1	0.1	0.1	6.9	116.1
Junee Sub	0.1	4.4	0.3	1.9	61.8	19.9	9.8	0.5	0.9	0.2	0.1	0.1	0.1	7.2	114.2
Maimuru	0.1	4.3	0.3	1.9	61.8	19.5	10.2	0.5	0.9	0.2	0.1	0.1	0.1	7.1	114.6
Milbrulong	0.1	4.5	0.3	2.1	61.0	20.4	9.9	0.5	0.8	0.2	0.0	0.1	0.1	7.5	114.5
Rand	0.1	4.3	0.3	2.0	61.9	19.6	9.9	0.5	0.8	0.2	0.1	0.1	0.1	7.2	114.2
Stockinbingal	0.1	4.4	0.3	2.0	61.0	20.2	10.2	0.5	0.9	0.2	0.1	0.1	0.1	7.2	115.1
The Rock	0.1	4.4	0.3	1.9	61.2	19.8	10.4	0.5	0.9	0.2	0.1	0.1	0.1	7.2	115.1
Wyalong															
Ardlethan	0.1	4.4	0.3	2.3	64.0	18.9	8.0	0.5	0.9	0.2	0.1	0.1	0.1	7.7	109.9
Barellan	0.1	4.2	0.3	2.2	62.5	19.1	9.8	0.5	0.9	0.3	0.0	0.1	0.1	7.3	113.3
Temora Sub	0.1	4.3	0.3	2.1	63.0	19.1	9.3	0.5	0.9	0.2	0.1	0.1	0.1	7.3	112.5
Wyalong	0.1	4.3	0.3	2.3	64.5	18.9	7.8	0.5	0.8	0.2	0.1	0.1	0.1	7.5	109.5
Central Mean	**0.1**	**4.3**	**0.3**	**2.0**	**62.1**	**19.5**	**9.8**	**0.5**	**0.9**	**0.2**	**0.1**	**0.1**	**0.1**	**7.2**	**113.9**
Northern															
Narrabri															
Premer	0.1	4.4	0.3	2.0	62.2	20.1	9.1	0.5	0.9	0.2	0.0	0.1	0.1	7.3	113.1
Ulamambri	0.1	4.7	0.3	2.0	62.9	19.1	9.0	0.5	0.9	0.2	0.0	0.1	0.1	7.7	111.7
Northern Mean	**0.1**	**4.5**	**0.3**	**2.0**	**62.3**	**19.9**	**9.1**	**0.5**	**0.9**	**0.2**	**0.0**	**0.1**	**0.1**	**7.4**	**112.9**
NSW Mean	**0.1**	**4.3**	**0.3**	**2.0**	**62.1**	**19.5**	**9.8**	**0.5**	**0.9**	**0.2**	**0.1**	**0.1**	**0.1**	**7.2**	**113.9**

[1]Sat - Sum of the saturated fatty acids including 14:0, 16:0, 18:0, 20:0, 22:0 and 24:0

[2] Iodine Value - Calculated from the fatty acid composition

Fatty Acid Composition- Victoria

Table 8 Fatty Acid Composition- Victoria

Division/ Region/ Receival Site	14:0	16:0	16:1	18:0	18:1	18:2	18:3	20:0	20:1	22:0	22:1	24:0	24:1	[1] Sat.	[2] Iodine Value
Southern															
Horsham															
Berrybank	0.1	4.2	0.3	1.8	61.4	19.1	11.0	0.5	1.0	0.2	0.1	0.1	0.1	7.0	115.8
Beulah St	0.1	4.1	0.3	2.0	61.1	19.9	10.8	0.4	0.8	0.2	0.0	0.1	0.1	6.9	116.3
Carpolac	0.1	4.1	0.3	2.0	61.9	18.8	10.5	0.5	1.1	0.3	0.1	0.1	0.1	7.2	114.6
Goroke	0.1	4.3	0.3	1.9	60.1	20.1	11.4	0.5	1.0	0.2	0.1	0.1	0.1	7.0	117.2
Hamilton	0.1	4.3	0.3	1.8	61.0	19.5	11.0	0.5	0.9	0.2	0.2	0.1	0.1	7.0	116.2
Horsham	0.1	4.2	0.3	1.9	61.1	19.6	11.0	0.4	0.9	0.2	0.1	0.1	0.1	6.9	116.2
Laharum	0.1	4.3	0.3	1.9	61.9	18.9	10.7	0.5	0.9	0.2	0.1	0.1	0.1	7.1	115.0
Lillimur	0.1	4.3	0.3	2.0	61.6	19.3	10.6	0.5	0.9	0.2	0.1	0.1	0.1	7.1	115.2
Lubeck	0.1	4.2	0.3	2.0	63.1	18.5	9.9	0.5	1.0	0.2	0.0	0.1	0.1	7.1	113.3
Marmalake	0.1	4.2	0.3	1.9	61.3	19.5	10.7	0.5	1.0	0.2	0.1	0.1	0.1	7.0	115.5
Naracoorte	0.1	4.3	0.3	1.8	59.3	20.5	11.7	0.5	1.0	0.2	0.0	0.1	0.1	7.0	118.3
Natimuk	0.1	4.3	0.3	1.9	60.3	19.7	11.4	0.5	1.0	0.2	0.2	0.1	0.1	7.0	117.1
Nhill	0.1	4.2	0.2	2.0	62.1	19.1	10.3	0.5	0.9	0.2	0.0	0.1	0.1	7.1	114.6
Rainbow	0.1	3.9	0.3	2.2	62.7	19.0	10.2	0.4	0.8	0.2	0.0	0.1	0.1	6.8	114.5
Skipton	0.1	4.2	0.3	1.8	60.5	19.5	11.8	0.5	1.0	0.2	0.1	0.1	0.1	6.8	117.7
Warracknabeal	0.1	4.4	0.3	2.1	59.6	20.6	11.0	0.5	0.9	0.3	0.0	0.1	0.1	7.4	116.6
Westmere	0.1	4.3	0.3	1.8	60.5	19.8	11.5	0.4	0.9	0.2	0.1	0.1	0.1	6.9	117.3
Willaura	0.1	4.4	0.3	1.8	60.2	20.1	11.4	0.4	0.9	0.2	0.0	0.1	0.1	7.1	117.2
Yanac	0.1	4.3	0.3	2.0	61.8	19.3	10.5	0.4	0.8	0.2	0.1	0.1	0.1	7.1	115.1
Marong															
Borung	0.1	4.3	0.3	2.1	62.0	19.1	10.0	0.5	1.0	0.2	0.1	0.1	0.1	7.4	113.8
Cope Cope	0.1	4.3	0.3	2.0	62.5	19.0	9.8	0.5	0.9	0.2	0.0	0.2	0.1	7.3	113.2
Deniliquin	0.1	4.2	0.3	2.0	62.2	19.0	10.3	0.5	0.9	0.2	0.1	0.1	0.2	7.1	114.3
Dookie St	0.1	4.2	0.3	1.8	61.4	19.5	10.9	0.4	0.9	0.2	0.1	0.1	0.1	6.8	116.1
Dunolly	0.1	4.2	0.3	2.0	61.8	18.8	10.7	0.5	1.0	0.2	0.2	0.1	0.1	7.1	115.0
Echuca	0.1	4.1	0.3	2.1	62.9	18.8	9.7	0.5	1.0	0.2	0.1	0.1	0.1	7.2	113.1
Elmore	0.1	4.2	0.3	2.0	62.1	18.8	10.7	0.5	0.9	0.2	0.1	0.1	0.1	7.0	115.1
Mitiamo	0.1	4.3	0.3	2.2	62.4	19.0	10.0	0.4	0.8	0.2	0.1	0.1	0.1	7.2	113.8
Moolort	0.1	4.2	0.3	1.9	61.0	19.4	11.2	0.5	1.0	0.2	0.1	0.1	0.1	7.0	116.4
Murchison East	0.1	4.2	0.2	1.8	61.5	19.5	11.0	0.4	0.9	0.2	0.1	0.1	0.1	6.7	116.4
Oaklands	0.1	4.4	0.3	1.9	61.5	20.0	10.1	0.4	0.8	0.2	0.1	0.1	0.1	7.1	114.9
Raywood	0.1	4.2	0.3	2.0	61.5	19.4	10.6	0.4	0.9	0.2	0.2	0.1	0.1	7.0	115.3
Sanger	0.1	4.3	0.3	1.9	62.3	19.5	9.9	0.4	0.9	0.2	0.1	0.1	0.1	7.0	114.2
St James	0.1	4.2	0.2	1.8	61.7	19.3	10.8	0.4	0.9	0.2	0.1	0.1	0.1	6.8	115.9
Tocumwal	0.1	4.1	0.3	2.0	63.2	18.7	9.7	0.5	0.9	0.2	0.1	0.1	0.1	7.0	113.1
Wangamong	0.1	4.4	0.3	2.0	62.2	19.7	9.8	0.4	0.8	0.2	0.0	0.1	0.1	7.1	114.1
Yarrawonga	0.1	4.2	0.3	1.8	61.8	19.4	10.5	0.4	0.9	0.2	0.1	0.1	0.1	6.9	115.3
Swan Hill															
Birchip	0.1	4.2	0.3	2.1	61.9	19.4	10.3	0.5	0.9	0.2	0.0	0.1	0.1	7.1	114.8
Quambatook	0.1	4.0	0.3	2.3	62.4	19.2	10.1	0.5	0.8	0.2	0.0	0.1	0.1	7.1	114.1
Swan Hill	0.1	4.2	0.3	2.1	61.0	19.9	10.8	0.4	0.8	0.2	0.0	0.1	0.1	7.1	116.0
Vic Mean	**0.1**	**4.2**	**0.3**	**1.9**	**61.4**	**19.5**	**10.7**	**0.5**	**0.9**	**0.2**	**0.1**	**0.1**	**0.1**	**7.0**	**115.6**

[1]Sat - Sum of the saturated fatty acids including 14:0, 16:0, 18:0, 20:0, 22:0 and 24:0

[2] Iodine Value - Calculated from the fatty acid composition

Fatty Acid Composition- South Australia

Table 9 Fatty Acid Composition- South Australia

Division/ Region/ Receival Site	14:0	16:0	16:1	18:0	18:1	18:2	18:3	20:0	20:1	22:0	22:1	24:0	24:1	[1] Sat.	[2] Iodine Value
Andrews	0.1	4.2	0.2	1.9	62.1	19.5	10.3	0.4	0.9	0.2	0.1	0.1	0.1	6.9	115.0
Ardrossan	0.1	4.3	0.3	1.9	61.8	19.7	10.3	0.4	0.8	0.2	0.0	0.1	0.1	6.9	115.1
Bowmans	0.1	4.4	0.3	1.8	62.1	19.6	10.2	0.4	0.8	0.2	0.0	0.1	0.1	6.9	114.9
Coomandook	0.1	4.1	0.3	1.9	62.3	19.4	10.2	0.4	0.9	0.2	0.0	0.1	0.1	6.8	114.9
Cummins	0.1	4.4	0.3	1.7	61.0	20.2	10.7	0.4	0.9	0.2	0.1	0.1	0.1	6.8	116.3
Keith	0.1	4.3	0.3	1.9	61.3	19.3	11.1	0.5	0.9	0.2	0.0	0.1	0.1	7.0	116.0
Kingscote	0.1	4.2	0.2	1.7	60.7	19.7	11.5	0.4	0.9	0.2	0.1	0.1	0.1	6.7	117.4
Port Adelaide	0.1	4.3	0.3	1.9	61.4	19.5	10.7	0.4	0.9	0.2	0.1	0.1	0.1	7.0	115.6
Port Lincoln	0.1	4.4	0.3	1.7	61.1	20.0	10.7	0.4	0.8	0.2	0.0	0.1	0.1	6.9	116.2
Roseworthy	0.1	4.3	0.2	1.8	61.6	19.7	10.5	0.4	0.9	0.2	0.1	0.1	0.1	6.9	115.6
Tailem Bend	0.1	4.2	0.3	1.9	62.2	19.6	10.3	0.4	0.8	0.2	0.0	0.1	0.1	6.8	115.2
Wolseley	0.1	4.2	0.3	1.9	61.5	19.3	10.9	0.5	0.9	0.2	0.0	0.1	0.1	7.0	115.9
SA Mean	**0.1**	**4.3**	**0.3**	**1.8**	**61.5**	**19.7**	**10.6**	**0.4**	**0.8**	**0.2**	**0.0**	**0.1**	**0.1**	**6.9**	**115.7**

[1]Sat - Sum of the saturated fatty acids including 14:0, 16:0, 18:0, 20:0, 22:0 and 24:0

[2] Iodine Value - Calculated from the fatty acid composition

Fatty Acid Composition- Western Australia

Table 10 Fatty Acid Composition- Western Australia

Division/ Region/ Receival Site	14:0	16:0	16:1	18:0	18:1	18:2	18:3	20:0	20:1	22:0	22:1	24:0	24:1	[1] Sat.	[2] Iodine Value
Albany															
Borden	0.1	4.4	0.3	1.8	58.1	20.8	12.6	0.4	0.9	0.2	0.1	0.1	0.2	7.0	120.1
Broomehill	0.1	4.5	0.3	1.9	58.8	20.4	12.4	0.4	0.8	0.2	0.1	0.1	0.1	7.1	119.2
Gairdner	0.1	4.3	0.3	1.7	58.4	20.8	12.6	0.4	0.9	0.2	0.1	0.1	0.1	6.7	120.2
Esperance															
Beaumont	0.1	4.3	0.3	1.8	59.1	20.3	12.2	0.5	0.9	0.2	0.1	0.1	0.2	6.9	119.0
Cascades	0.1	4.4	0.3	1.7	59.4	20.5	11.9	0.4	0.9	0.2	0.0	0.1	0.2	6.9	118.5
Lake Varley	0.1	4.3	0.3	1.8	58.8	20.7	12.0	0.4	1.0	0.2	0.1	0.1	0.2	7.0	118.8
Geraldton															
Northampton	0.1	4.5	0.3	1.5	55.8	23.2	12.7	0.4	1.0	0.3	0.0	0.1	0.2	6.9	122.4
Yuna	0.1	4.5	0.2	1.5	56.5	22.7	12.6	0.4	0.9	0.2	0.0	0.1	0.1	6.8	121.9
Kwinana															
Avon	0.1	4.5	0.2	1.7	57.9	21.8	11.9	0.4	0.9	0.2	0.0	0.1	0.1	7.0	119.8
Brookton	0.1	4.2	0.2	1.7	58.1	21.6	12.2	0.4	0.9	0.2	0.0	0.1	0.1	6.8	120.2
Kellerberrin	0.1	4.7	0.3	1.6	56.7	22.7	12.3	0.4	0.9	0.2	0.0	0.0	0.1	7.0	121.2
Moora	0.1	4.3	0.3	1.6	59.3	21.4	11.3	0.4	0.9	0.2	0.1	0.1	0.1	6.7	118.5
WA Mean	**0.1**	**4.4**	**0.3**	**1.7**	**58.3**	**21.2**	**12.2**	**0.4**	**0.9**	**0.2**	**0.1**	**0.1**	**0.1**	**6.9**	**119.9**

[1]Sat - Sum of the saturated fatty acids including 14:0, 16:0, 18:0, 20:0, 22:0 and 24:0

[2] Iodine Value - Calculated from the fatty acid composition

National Brassica Improvement Project – Quality Data

Oil Content for 2005 Early Canola Breeding Trials

Table 11 %Oil content for 2005 early canola breeding trials (in whole seed at 6% moisture)

S2 Early Conventional Trials						S2 Early Triazine Trials						S2 Clearfield Trials				
Variety	H	M	N	W	Mean	Variety	H	M	N	W	Mean	Variety	M	N	W	Mean
AG-OUTBACK	38.3	37.5	39.8	36.9	**38.2**	ATR-BEACON	35.1	37.1	42.1	35.6	**37.5**	44C73	39.5	43.5	38.9	**40.6**
AG-SPECTRUM	37.7	*	41.6	*	**39.7**	ATR-STUBBY	35.4	37.9	42.0	35.9	**37.8**	BLN2825CL-03W01	40.3	44.6	41.4	**42.1**
BLN2847-03M03	42.4	41.7	42.1	39.9	**41.5**	ATR403	37.2	39.9	43.0	37.2	**39.3**	BLN2864CL-03M08	39.2	42.1	40.0	**40.4**
BLN2847-03M04	42.0	40.4	39.9	39.1	**40.4**	ATR404	37.1	38.4	41.8	37.3	**38.6**	BLN2864CL-03W26	39.0	42.7	41.5	**41.1**
BLN2847-03W06	41.5	41.2	41.1	40.9	**41.2**	ATR407	35.9	38.7	41.6	36.9	**38.3**	BLN2865CL-03W01	39.3	44.2	41.6	**41.7**
BLN2850-03W03	38.8	40.9	40.9	38.3	**39.7**	ATR411	37.8	40.6	44.3	38.5	**40.3**	BLN2865CL-03W14	39.0	44.1	40.5	**41.2**
BLN2850-03W06	40.6	40.5	41.9	39.3	**40.6**	ATR501	36.4	38.1	42.6	36.5	**38.4**	BLN2867CL-03M07	40.6	44.3	40.5	**41.8**
BLN2851-03W04	40.3	40.5	40.4	40.3	**40.4**	ATR502	36.9	37.8	41.3	36.7	**38.2**	BLN2867CL-03W05	39.6	44.7	41.9	**42.1**
BLN2852-03W03	42.2	43.1	41.2	41.4	**42.0**	ATR503	35.4	37.4	40.4	35.7	**37.2**	BLN2868CL-03M02	38.9	43.7	39.6	**40.7**
BLN2852-03W05	42.5	42.1	42.1	41.1	**41.9**	ATR504	34.9	37.7	42.2	35.4	**37.5**	BLN3626CL	40.2	44.8	42.2	**42.4**
BLN3575	40.9	40.9	41.2	39.5	**40.6**	ATR505	37.7	38.0	44.1	37.8	**39.4**	BLN3627CL	39.8	43.7	41.9	**41.8**
BLN3613	40.6	40.3	41.9	40.4	**40.8**	BLN3618TT	39.0	38.7	44.7	39.1	**40.4**	BLN3628CL	40.1	43.9	41.4	**41.8**
BLN3614	43.6	43.4	41.5	40.4	**42.2**	BLN3619TT	37.7	39.5	44.9	39.1	**40.3**	BLN3629CL	41.6	45.3	44.0	**43.6**
BLN3615	43.3	42.7	42.2	40.9	**42.3**	BLN3620TT	38.7	39.9	44.8	39.8	**40.8**					
BLN3616	40.6	41.6	41.0	38.7	**40.5**	BLN3621TT	37.8	39.7	44.9	37.7	**40.0**					
BLN3617	41.9	42.5	41.8	40.8	**41.8**	BLN3622TT	38.4	40.0	43.8	38.0	**40.1**					
KIMBERLEY	38.8	39.1	*	37.8	**38.6**	BLN3623TT	38.3	37.5	45.4	38.1	**39.8**					
RIVETTE	40.5	40.7	40.7	39.1	**40.2**	BLN3624TT	38.7	39.8	44.2	38.9	**40.4**					
RR002	41.2	*	*	*	**41.2**	BLN3625TT	38.0	39.6	43.0	39.1	**39.9**					
RT056	42.0	41.6	40.6	42.1	**41.6**	SARDI519TT	36.4	38.0	43.0	36.7	**38.5**					
RT057	41.6	41.3	39.1	40.6	**40.6**	SARDI520TT	35.0	37.1	41.6	35.9	**37.4**					
RT058	41.6	41.1	40.0	39.3	**40.5**	SARDI521TT	35.8	35.9	42.8	34.9	**37.3**					
RT059	41.3	40.6	41.8	41.4	**41.3**	SARDI522TT	36.9	38.4	42.2	36.2	**38.4**					
RT073	41.4	41.1	40.3	41.4	**41.0**	SARDI523TT	37.0	38.3	44.9	37.1	**39.3**					
RT076	42.3	40.7	41.5	41.3	**41.5**	SARDI524TT	37.7	39.5	43.4	39.3	**40.0**					
RT078	39.9	40.5	42.0	38.7	**40.3**	SARDI525TT	36.7	39.5	42.5	36.9	**38.9**					
SARDI501	*	39.4	41.4	39.4	**40.1**	SARDI526TT	36.2	38.0	43.2	36.8	**38.6**					
SARDI502	*	40.9	42.1	38.6	**40.5**	SARDI527TT	36.1	38.9	43.3	36.2	**38.6**					
SARDI503	39.1	40.1	41.7	39.2	**40.0**	TR002-03M04	37.6	38.9	44.5	37.4	**39.6**					
SARDI504	*	40.9	41.8	38.3	**40.3**	TR002-03W06	37.5	38.9	43.0	37.5	**39.2**					
SARDI505	41.6	41.3	40.8	39.4	**40.8**	TR003-03M02	36.3	37.4	42.4	36.7	**38.2**					
SARDI506	*	39.1	41.1	38.5	**39.6**	TRANBY	*	*	42.9	*	**42.9**					
SARDI507	*	39.7	39.7	38.5	**39.3**	TRIGOLD	37.3	40.1	43.8	38.2	**39.9**					
SARDI508	*	38.7	41.5	37.3	**39.2**											

H = Horsham - Vic, M = Minnipa - SA, N = Newdegate - WA, W = Wagga Wagga - NSW

Oil Content for 2005 Mid Canola Breeding Trials

Table 12 %Oil Content for 2005 mid canola breeding trials (in whole seed at 6% moisture)

S2 Mid Conventional Trials						S2 Mid Triazine Trials						S2 Mid Clearfield Trials				
Variety	**B**	**H**	**S**	**W**	**Mean**	**Variety**	**H**	**K**	**S**	**W**	**Mean**	**Variety**	**K**	**S**	**W**	**Mean**
45C75	*	39.4	*	*	**39.4**	ATR-BEACON	36.7	44.1	38.1	36.0	**38.7**	45C75	47.8	39.5	40.9	**42.8**
46C04	*	37.7	38.6	35.5	**37.2**	ATR-GRACE	36.6	43.0	37.6	36.5	**38.4**	46C76	46.5	40.4	39.4	**42.1**
46C76	*	39.1	*	*	**39.1**	ATR422	37.2	42.9	39.7	37.1	**39.2**	BLN2866CL-03	48.7	41.6	43.4	**44.6**
AG-COMET	43.2	*	*	*	**43.2**	ATR423	39.2	45.4	38.9	39.1	**40.7**	BLN3640CL	44.2	40.2	39.1	**41.2**
AG-SPECTRU	*	37.0	39.9	37.2	**38.0**	ATR425	38.0	44.1	39.7	37.9	**39.9**	BLN3641CL	47.2	40.3	41.0	**42.8**
AV-SAPPHIRI	45.9	38.6	42.6	38.8	**41.5**	ATR436	36.3	44.2	40.3	36.5	**39.3**	BLN3642CL	48.1	41.7	41.7	**43.8**
BLN2852-03M	46.8	40.0	40.5	39.3	**41.6**	ATR437	37.5	42.4	38.3	35.9	**38.5**	BLN3643CL	46.9	39.9	40.2	**42.3**
BLN2852-03W	46.2	40.9	42.7	39.2	**42.2**	ATR441	38.2	42.5	38.6	37.2	**39.1**	WARRIORCL	46.8	*	*	**46.8**
BLN2855-03W	47.3	42.6	42.6	39.1	**42.9**	ATR444	39.5	46.9	40.1	39.4	**41.5**					
BLN2857-03M	47.3	41.2	41.5	39.3	**42.3**	ATR446	39.1	46.9	40.7	39.7	**41.6**					
BLN3562	47.3	41.4	41.7	40.3	**42.7**	ATR505	*	44.2	*	*	**44.2**					
BLN3571	45.7	39.9	41.1	37.8	**41.2**	BLN3632TT	38.1	46.9	41.0	37.4	**40.8**					
BLN3579	47.2	40.5	42.2	38.6	**42.1**	BLN3633TT	37.5	45.0	38.7	37.4	**39.7**					
BLN3606	46.3	41.7	42.0	38.9	**42.2**	BLN3634TT	39.2	46.1	40.5	38.5	**41.1**					
BLN3630	47.5	40.9	44.0	39.7	**43.0**	BLN3635TT	39.4	46.2	38.3	37.2	**40.3**					
BLN3631	48.1	40.9	42.1	40.0	**42.8**	BLN3636TT	36.4	45.1	39.1	37.6	**39.5**					
ROCKETCL	*	40.1	39.7	*	**39.9**	BLN3637TT	39.4	46.2	40.6	37.6	**41.0**					
RR002-03M05	47.4	41.3	42.1	40.8	**42.9**	BLN3638TT	39.0	45.7	40.8	39.3	**41.2**					
RR009-03M04	46.6	41.0	41.5	38.9	**42.0**	BLN3639TT	38.0	47.0	40.6	38.0	**40.9**					
RT095	45.7	40.1	42.7	39.3	**41.9**	BRAVOTT	35.9	45.2	38.3	35.8	**38.8**					
RT096	47.0	41.2	45.5	38.8	**43.1**	THUNDERTT	*	44.6	*	*	**44.6**					
RT108	47.0	40.9	42.5	37.5	**42.0**	TORNADOTT	38.8	46.7	41.5	39.2	**41.6**					
RT117	46.1	40.1	42.4	38.4	**41.8**	TR004-03W13	37.4	44.3	39.3	38.9	**40.0**					
RT123	47.1	40.8	42.4	38.1	**42.1**	TR005-03W09	37.0	43.4	40.8	37.0	**39.5**					
RT130	46.3	40.4	40.7	37.7	**41.3**	TR005-03W23	37.9	45.4	39.6	38.8	**40.4**					
RT146	46.5	39.5	42.4	39.3	**41.9**	TR006-03M12	38.5	45.4	40.9	38.9	**40.9**					
RT148	47.9	40.1	41.9	39.9	**42.4**	TR006-03W08	38.0	46.8	40.0	38.9	**40.9**					
SARDI509	46.1	39.8	44.2	39.7	**42.5**	TR006-03W09	37.9	45.2	41.1	38.8	**40.8**					
SKIPTON	46.9	40.9	41.2	38.8	**42.0**	TR006-03W30	38.5	48.3	42.0	39.3	**42.0**					
						TR006-03W31	37.5	44.6	40.1	38.6	**40.2**					

B = Beverely - WA, H = Horsham - Vic, S = Struan - SA, W = Wagga Wagga - NSW, K = Katanning - WA

Protein Content for 2005 Early Canola Breeding Trials

Table 13 %Protein content for 2005 early canola breeding trials (in oil free meal at 10% moisture)

S2 Early Conventional Trails						S2 Early Triazine Trials						S2 Clearfield Trials				
Variety	H	M	N	W	Mean	Variety	H	M	N	W	Mean	Variety	M	N	W	Mean
AG-OUTBACK	39.2	41.2	39.5	39.5	**39.9**	ATR-BEACON	42.8	43.3	38.3	42.1	**41.6**	44C73	38.3	36.0	39.8	**38.0**
AG-SPECTRUM	38.6	*	39.3	*	**39.0**	ATR-STUBBY	40.0	40.1	36.2	39.7	**39.0**	BLN2825CL-03W01	40.8	38.5	42.7	**40.7**
BLN2847-03M03	40.1	38.1	39.6	41.2	**39.7**	ATR403	42.6	41.6	38.2	41.5	**40.9**	BLN2864CL-03M08	38.0	36.5	39.7	**38.0**
BLN2847-03M04	38.2	38.5	40.4	40.9	**39.5**	ATR404	42.7	44.6	40.1	44.2	**42.9**	BLN2864CL-03W26	38.9	37.4	40.3	**38.8**
BLN2847-03W06	40.3	38.5	39.6	42.4	**40.2**	ATR407	42.7	43.3	39.6	43.9	**42.4**	BLN2865CL-03W01	38.6	37.5	41.1	**39.1**
BLN2850-03W03	40.8	40.9	41.1	41.8	**41.2**	ATR411	43.2	44.9	39.6	44.5	**43.1**	BLN2865CL-03W14	39.8	37.7	41.2	**39.6**
BLN2850-03W06	41.4	41.1	39.8	41.3	**40.9**	ATR501	39.5	40.6	36.2	40.2	**39.1**	BLN2867CL-03M07	40.7	38.1	41.4	**40.1**
BLN2851-03W04	40.2	39.5	39.7	41.4	**40.2**	ATR502	38.4	39.9	36.3	39.9	**38.6**	BLN2867CL-03W05	40.2	37.5	41.0	**39.6**
BLN2852-03W03	40.6	39.4	38.8	41.2	**40.0**	ATR503	39.6	39.7	36.3	39.2	**38.7**	BLN2868CL-03M02	38.7	38.8	41.6	**39.7**
BLN2852-03W05	38.7	38.7	39.6	41.2	**39.5**	ATR504	40.6	41.3	37.0	40.5	**39.9**	BLN3626CL	39.4	37.5	39.8	**38.9**
BLN3575	41.7	42.1	38.2	42.6	**41.1**	ATR505	42.5	42.8	39.4	42.1	**41.7**	BLN3627CL	42.3	38.2	41.9	**40.8**
BLN3613	40.7	41.6	37.0	42.4	**40.4**	BLN3618TT	41.9	41.6	38.0	42.9	**41.1**	BLN3628CL	40.7	39.3	41.9	**40.6**
BLN3614	39.3	41.5	40.0	41.1	**40.5**	BLN3619TT	41.3	42.0	38.5	41.6	**40.9**	BLN3629CL	42.2	39.5	40.6	**40.8**
BLN3615	37.9	41.7	39.4	41.4	**40.1**	BLN3620TT	42.3	41.8	38.4	42.5	**41.2**					
BLN3616	41.3	40.8	38.4	42.6	**40.8**	BLN3621TT	40.6	42.0	39.0	42.1	**40.9**					
BLN3617	39.9	39.7	39.1	41.3	**40.0**	BLN3622TT	41.1	42.9	38.1	41.6	**40.9**					
KIMBERLEY	38.4	39.5	*	40.4	**39.4**	BLN3623TT	41.8	40.9	38.8	41.6	**40.8**					
RIVETTE	40.0	42.3	40.2	42.1	**41.2**	BLN3624TT	41.2	42.4	38.5	42.1	**41.1**					
RR002	41.3	*		*	**41.3**	BLN3625TT	42.0	42.5	37.4	42.4	**41.1**					
RT056	39.1	41.8	40.1	41.0	**40.5**	SARDI519TT	41.5	40.3	37.5	41.0	**40.1**					
RT057	39.8	41.0	41.9	41.3	**41.0**	SARDI520TT	42.5	39.9	39.0	41.6	**40.7**					
RT058	39.2	42.0	39.6	40.6	**40.3**	SARDI521TT	42.1	40.6	40.1	41.8	**41.1**					
RT059	39.9	42.0	38.5	41.7	**40.5**	SARDI522TT	43.4	40.7	36.6	42.7	**40.8**					
RT073	42.5	42.2	41.3	43.2	**42.3**	SARDI523TT	42.0	41.9	38.2	41.5	**40.9**					
RT076	40.6	42.5	38.4	42.8	**41.0**	SARDI524TT	40.7	41.2	40.2	40.8	**40.7**					
RT078	38.6	38.8	40.3	39.8	**39.4**	SARDI525TT	44.2	39.2	37.6	43.4	**41.1**					
SARDI501	*	43.3	40.4	42.5	**42.0**	SARDI526TT	41.3	43.3	38.1	41.1	**41.0**					
SARDI502	*	40.4	39.3	41.3	**40.3**	SARDI527TT	42.5	40.3	40.0	42.3	**41.3**					
SARDI503	38.1	39.5	39.4	40.8	**39.5**	TR002-03M04	42.1	42.8	38.9	41.8	**41.4**					
SARDI504	*	39.2	38.2	40.1	**39.2**	TR002-03W06	41.5	42.3	38.5	41.3	**40.9**					
SARDI505	38.5	40.6	38.3	41.0	**39.6**	TR003-03M02	41.9	40.0	38.0	42.4	**40.6**					
SARDI506	*	39.6	38.5	41.0	**39.7**	TRANBY	*	41.6	40.1	*	**40.9**					
SARDI507	*	39.0	40.3	39.1	**39.5**	TRIGOLD	41.5	41.2	37.7	40.5	**40.2**					
SARDI508	*	37.4	39.7	39.9	**39.0**											

H = Horsham - Vic, M = Minnipa - SA, Newdegate - WA, W = Wagga Wagga - NSW

Protein Content for 2005 Mid Canola Breeding Trials

Table 14 %Protein content for 2005 mid canola breeding trials (in oil free meal at 10% moisture)

S2 Mid Conventional Trials						S2 Mid Triazine Trials						S2 Mid Clearfield Trials				
Variety	**B**	**H**	**S**	**W**	**Mean**	**Variety**	**H**	**K**	**S**	**W**	**Mean**	**Variety**	**K**	**S**	**W**	**Mean**
45C75	*	39.3	*	*	**39.3**	ATR-BEACON	41.4	34.1	42.5	39.8	**39.5**	45C75	30.8	43.2	37.2	**37.1**
46C04	*	38.1	40.5	40.0	**39.5**	ATR-GRACE	42.7	35.0	42.3	41.1	**40.3**	46C76	32.8	42.3	37.6	**37.5**
46C76	*	39.0	*	*	**39.0**	ATR422	43.5	35.0	43.9	41.5	**41.0**	BLN2866CL-03W(	30.5	42.2	38.2	**37.0**
AG-COMET	31.6	*	*	*	**31.6**	ATR423	42.5	34.2	44.3	41.5	**40.6**	BLN3640CL	31.1	42.7	37.5	**37.1**
AG-SPECTRUM	35.6	39.4	39.4	38.4	**38.2**	ATR425	43.6	36.1	43.2	41.4	**41.1**	BLN3641CL	31.1	41.2	37.6	**36.6**
AV-SAPPHIRE	*	40.3	42.1	40.9	**41.1**	ATR436	44.9	36.5	44.0	42.0	**41.9**	BLN3642CL	31.5	43.4	37.4	**37.5**
BLN2852-03M03	34.5	41.1	41.6	41.1	**39.6**	ATR437	44.6	36.7	43.6	42.5	**41.9**	BLN3643CL	30.8	42.6	38.1	**37.2**
BLN2852-03W02	34.7	40.9	41.3	41.6	**39.6**	ATR441	43.4	35.4	42.1	41.4	**40.6**	WARRIORCL	32.3	*	*	**32.3**
BLN2855-03W03	35.3	39.7	42.3	41.5	**39.7**	ATR444	44.3	36.7	43.7	41.5	**41.6**					
BLN2857-03M02	36.8	40.5	42.0	42.1	**40.3**	ATR446	44.6	37.3	44.0	41.4	**41.8**					
BLN3562	35.2	41.6	42.8	42.5	**40.5**	ATR505	*	35.9	*	*	**35.9**					
BLN3571	35.1	39.8	42.1	41.4	**39.6**	BLN3632TT	43.0	34.3	45.5	42.3	**41.3**					
BLN3579	36.6	41.0	42.7	42.3	**40.7**	BLN3633TT	41.6	33.5	40.7	40.8	**39.2**					
BLN3606	33.9	37.6	39.6	40.4	**37.9**	BLN3634TT	43.1	36.3	42.8	41.5	**40.9**					
BLN3630	36.1	42.2	42.7	42.9	**41.0**	BLN3635TT	43.6	35.0	43.0	41.6	**40.8**					
BLN3631	35.2	40.9	42.2	42.2	**40.1**	BLN3636TT	40.8	32.6	41.4	39.7	**38.6**					
ROCKETCL	*	43.2	40.0	*	**41.6**	BLN3637TT	45.2	37.4	44.9	42.9	**42.6**					
RR002-03M05	35.6	41.8	43.5	42.6	**40.8**	BLN3638TT	44.8	34.4	42.4	42.8	**41.1**					
RR009-03M04	36.4	41.5	43.3	43.1	**41.1**	BLN3639TT	43.3	32.8	43.1	41.8	**40.3**					
RT095	35.6	41.0	41.5	41.8	**40.0**	BRAVOTT	42.0	31.9	41.0	39.7	**38.7**					
RT096	35.6	41.2	42.0	41.9	**40.2**	THUNDERTT	*	35.4	*	*	**35.4**					
RT108	34.4	40.2	43.0	42.1	**39.9**	TORNADOTT	41.6	33.9	41.1	40.5	**39.3**					
RT117	33.9	38.7	40.0	39.4	**38.0**	TR004-03W13	42.5	34.2	41.8	39.3	**39.5**					
RT123	34.6	39.0	40.6	40.0	**38.5**	TR005-03W09	41.4	34.7	41.1	39.6	**39.2**					
RT130	33.6	37.9	40.1	38.9	**37.6**	TR005-03W23	40.9	32.5	42.1	38.1	**38.4**					
RT146	35.7	41.6	42.8	41.6	**40.4**	TR006-03M12	41.2	34.3	41.8	40.0	**39.3**					
RT148	35.3	42.6	42.8	43.4	**41.0**	TR006-03W08	41.9	32.0	42.7	39.5	**39.0**					
SARDI509	35.9	40.7	41.2	41.5	**39.9**	TR006-03W09	41.1	33.9	42.4	40.1	**39.4**					
SKIPTON	36.8	41.3	44.1	42.8	**41.2**	TR006-03W30	39.9	32.2	41.0	39.1	**38.1**					
						TR006-03W31	41.1	33.8	41.6	39.3	**39.0**					

B = Beverely - WA, H = Horsham - Vic, S = Struan - SA, W = Wagga Wagga - NSW, K = Katanning - WA

Glucosinolate Concentration for 2005 Early Canola Breeding Trials

Table 15 Glucosinolate concentrations for 2005 early canola breeding trials (µmoles/g in whole seed at 6% moisture)

S2 Early Conventional Trials						S2 Early Triazine Trials						S2 Clearfield Trials				
Variety	**H**	**M**	**N**	W	**Mean**	**Variety**	**H**	**M**	**N**	**W**	**Mean**	**Variety**	M	**N**	**W**	**Mean**
AG-OUTBACK	13	12	11	12	**12**	ATR-BEACON	12	10	8	11	**10**	44C73	7	6	10	**7**
AG-SPECTRUM	9	*	10	*	**9**	ATR-STUBBY	13	12	14	12	**13**	BLN2825CL-03W01	7	8	9	**8**
BLN2847-03M03	11	9	5	8	**8**	ATR403	10	9	10	12	**10**	BLN2864CL-03M08	10	8	9	**9**
BLN2847-03M04	12	8	6	8	**9**	ATR404	9	9	9	9	**9**	BLN2864CL-03W26	10	9	10	**10**
BLN2847-03W06	10	9	4	8	**8**	ATR407	13	12	11	9	**11**	BLN2865CL-03W01	10	8	9	**9**
BLN2850-03W03	10	7	6	9	**8**	ATR411	10	8	9	9	**9**	BLN2865CL-03W14	10	7	9	**9**
BLN2850-03W06	6	8	8	9	**8**	ATR501	9	11	10	10	**10**	BLN2867CL-03M07	9	7	8	**8**
BLN2851-03W04	9	8	6	7	**8**	ATR502	10	10	9	10	**10**	BLN2867CL-03W05	9	7	6	**7**
BLN2852-03W03	8	9	6	8	**8**	ATR503	15	14	15	14	**14**	BLN2868CL-03M02	10	9	9	**9**
BLN2852-03W05	6	5	6	7	**6**	ATR504	10	9	8	10	**9**	BLN3626CL	11	7	7	**8**
BLN3575	8	7	9	8	**8**	ATR505	13	12	10	10	**11**	BLN3627CL	9	9	9	**9**
BLN3613	8	9	10	9	**9**	BLN3618TT	10	11	9	10	**10**	BLN3628CL	9	7	7	**8**
BLN3614	6	8	4	10	**7**	BLN3619TT	11	9	8	9	**9**	BLN3629CL	8	7	8	**8**
BLN3615	6	4	9	7	**6**	BLN3620TT	12	10	7	10	**10**					
BLN3616	10	10	7	11	**10**	BLN3621TT	9	8	6	10	**8**					
BLN3617	13	9	6	8	**9**	BLN3622TT	8	8	11	9	**9**					
KIMBERLEY	10	8	*	10	**9**	BLN3623TT	12	12	8	10	**10**					
RIVETTE	10	7	8	9	**9**	BLN3624TT	10	8	7	10	**8**					
RR002	9	*	*	*	**9**	BLN3625TT	12	7	6	10	**9**					
RT056	11	11	3	10	**9**	SARDI519TT	8	12	5	9	**9**					
RT057	12	10	13	10	**11**	SARDI520TT	8	7	8	8	**8**					
RT058	10	9	10	9	**10**	SARDI521TT	9	8	6	7	**7**					
RT059	13	12	6	11	**10**	SARDI522TT	6	9	10	8	**8**					
RT073	9	10	6	8	**8**	SARDI523TT	9	7	5	9	**7**					
RT076	7	9	8	7	**8**	SARDI524TT	8	8	7	8	**8**					
RT078	11	11	7	10	**10**	SARDI525TT	10	8	9	9	**9**					
SARDI501	*	12	7	9	**9**	SARDI526TT	10	8	12	9	**10**					
SARDI502	*	9	4	9	**7**	SARDI527TT	8	6	6	10	**8**					
SARDI503	9	8	5	8	**8**	TR002-03M04	11	10	9	11	**10**					
SARDI504	*	7	9	8	**8**	TR002-03W06	13	9	12	9	**11**					
SARDI505	11	8	12	9	**10**	TR003-03M02	10	12	4	11	**9**					
SARDI506	*	9	7	10	**9**	TRANBY	*	8	8	*	**8**					
SARDI507	*	10	8	11	**10**	TRIGOLD	8	7	9	10	**9**					
SARDI508	*	12	5	11	**9**											

H = Horsham - Vic, M = Minnipa - SA, Newdegate - WA, W = Wagga Wagga - NSW

Glucosinolate Concentration for 2005 Mid Canola Breeding Trials

Table 16 Glucosinolate concentrations for 2005 mid canola breeding trials (µmoles/g in whole seed at 6% moisture)

S2 Mid Conventional Trials						S2 Mid Triazine Trials						S2 Mid Clearfield Trials				
Variety	**B**	H	**S**	W	**Mean**	**Variety**	**H**	K	**S**	W	Mean	**Variety**	**K**	S	W	Mean
45C75	*	9	*	*	**9**	ATR-BEACON	10	7	7	8	**8**	45C75	5	7	6	**6**
46C04	*	8	4	11	**8**	ATR-GRACE	13	11	8	8	**10**	46C76	5	10	7	**7**
46C76	*	10	*	*	**10**	ATR422	8	8	4	6	**7**	BLN2866CL-03W(	5	4	3	**4**
AG-COMET	10	*	*	*	**10**	ATR423	12	7	3	6	**7**	BLN3640CL	5	0	3	**3**
AG-SPECTRUM	*	10	5	9	**8**	ATR425	11	7	8	8	**9**	BLN3641CL	6	5	6	**5**
AV-SAPPHIRE	9	12	5	9	**9**	ATR436	11	11	8	9	**10**	BLN3642CL	11	4	5	**7**
BLN2852-03M03	6	10	6	8	**7**	ATR437	5	5	4	6	**5**	BLN3643CL	4	9	9	**8**
BLN2852-03W02	6	11	4	8	**7**	ATR441	8	7	5	8	**7**	WARRIORCL	5	*	*	**5**
BLN2855-03W03	6	9	3	8	**6**	ATR444	10	6	5	7	**7**					
BLN2857-03M02	6	12	9	8	**9**	ATR446	9	6	6	8	**7**					
BLN3562	7	9	5	7	**7**	ATR505	*	8	1	*	**5**					
BLN3571	7	9	4	8	**7**	BLN3632TT	7	6	6	7	**6**					
BLN3579	6	10	5	9	**7**	BLN3633TT	14	5	2	7	**7**					
BLN3606	8	12	4	9	**8**	BLN3634TT	11	5	5	8	**7**					
BLN3630	7	9	3	9	**7**	BLN3635TT	12	5	9	5	**8**					
BLN3631	4	9	5	8	**7**	BLN3636TT	11	8	0	9	**7**					
ROCKETCL	*	6	*	*	**6**	BLN3637TT	5	2	3	3	**3**					
RR002-03M05	5	10	4	7	**7**	BLN3638TT	11	7	8	7	**8**					
RR009-03M04	6	9	5	7	**7**	BLN3639TT	7	6	7	7	**6**					
RT095	7	11	8	10	**9**	BRAVOTT	11	7	*	10	**9**					
RT096	7	10	1	8	**7**	THUNDERTT	*	1	*	*	**1**					
RT108	4	8	6	10	**7**	TORNADOTT	9	3	2	5	**5**					
RT117	10	10	6	11	**9**	TR004-03W13	9	6	5	6	**6**					
RT123	4	8	5	10	**7**	TR005-03W09	12	9	5	4	**7**					
RT130	10	13	9	11	**11**	TR005-03W23	9	5	5	7	**6**					
RT146	8	10	3	9	**7**	TR006-03M12	11	1	6	5	**6**					
RT148	6	9	5	7	**7**	TR006-03W08	11	6	9	9	**8**					
SARDI509	8	10	5	9	**8**	TR006-03W09	11	4	3	6	**6**					
SKIPTON	9	11	7	11	**9**	TR006-03W30	10	6	8	7	**8**					
						TR006-03W31	12	3	8	6	**7**					

B = Beverely - WA, H = Horsham - Vic, S = Struan - SA, W = Wagga Wagga - NSW, K = Katanning - WA

Definition

Canola is a term used to describe seed of the species *Brassica napus or Brassica campestris*, the oil component of which seed contains less than 2 % erucic acid (C22:1) and the solid component of which seed contains less than 30 micromoles of any one of, or any mixture of, 3-butenyl glucosinolate, 4-pentenyl glucosinolate, 2-hydroxy-3-butenyl glucosinolate and 2-hydroxy-4-pentenyl glucosinolate per gram of air-dry, oil-free solid as measured by the gas chromatographic method of the Canadian Grain Commission (Canola Council, Winnipeg, Manitoba, Canada).

Methods

Moisture Content:

Moisture is determined on whole seed using a 6500 near infrared (NIR) spectrometer calibrated using AOF 4-1.6: “Moisture content of oilseeds oven method”. The moisture contents are used to convert the raw data for oil and protein to the appropriate moisture content for reporting.

Oil Content:

Oil content is determined by NIR calibrated from results obtained using method AOCS Am2-93. Ground seed is extracted on a Goldfische apparatus using petroleum ether (40-60 ^{0}C) for four hours. The sample is reground and extracted for 2 hours. The sample is again ground and extracted for a further 2 hours. The results are reported as a percentage of the seed at 6 % moisture.

Protein Content:

Protein content is determined on whole seed by NIR, calibrated from samples analysed by the LECO elemental analyser using AOF 4-3.3: “Protein, crude, of meals (combustion)”. Results are reported as percent protein (nitrogen x 6.25) and calculated to 10 % moisture on oil-free meal.

Glucosinolate Content:

Total glucosinolate concentration is determined by NIR, calibrated by method AOF 4-1.22: “Glucosinolate content, Glucose method, Canola and Rapeseed”. The method involves an enzymatic hydrolysis to release glucose followed by a colorimetric reaction and determination by a UV-Vis spectrophotometer. The method has compared favourably with the HPLC methodology of the AOCS with the added advantage of speed and economy. Results are reported as µmoles glucosinolates/gram whole seed at 6 % moisture.

Fatty Acid Composition:

Fatty acid composition involves methylation of fatty acids with sodium methoxide, AOF 4-2.18: “Preparation of fatty acid methyl esters”. The methyl esters are then separated on a gas chromatograph using a BPX70 capillary column. Fatty acids are reported as a percentage of the total fatty acids.

Iodine Values:

Iodine values are calculated from the fatty acid profile using AOF 4-2.14: “Iodine value by fatty acid composition”.

Volumetric Grain Weights:

Volumetric grain weights are measured using a Franklin chrondrometer and reported as both pounds/bushel and kilograms/hectolitre.