NSW GOVERNMENT
Department of Primary Industries

Quality of Australian canola

2020–21

www.dpi.nsw.gov.au

AOF
Australian Oilseeds Federation

Quality of Australian canola 2020–2021

KG Graham
NSW Department of Primary Industries
Wagga Wagga

DW McCaffery
NSW Department of Primary Industries
Orange

NC Goddard
Australian Oilseeds Federation
Sydney

Volume 26

ISSN 1322-9397

Job no.:17025

Published by Department of Primary Industries, a part of the Department of Regional NSW.

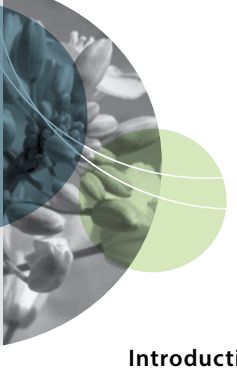
Cover
Photos: Leanne Groves (NSW DPI Wagga Wagga)

Acknowledgements
NSW Department of Primary Industries and the Australian Oilseeds Federation (AOF) would like to thank GrainCorp Operations Limited, Viterra Pty Ltd and CBH Group for providing samples from the 2020 harvest.

NSW Department of Primary Industries would like to thank the Bureau of Meteorology, Australian Bureau of Statistics and Department of Agriculture and Waters Resources for the production and use of maps used in this publication. Thanks are extended to Katherine Legudi, Abby Griffin and Nina Brown, GrainCorp, for organising samples and providing the Country Network maps of Northern NSW, Southern NSW and Victorian regions. Thanks also to Jade Saunders and Marzena Domagala, Viterra, for organising samples and providing the Storage and Network Handling map of South Australia regions.

NSW Department of Primary Industries would like to thank Andrew Ware (SARDI, Port Lincoln SA), Trent Potter (Yeruga Crop Research, Naracoorte SA), Dale Grey (DETJT&R, Bendigo Vic) and Michael Lamond (GIWA, Perth WA) for assistance in providing state updates.

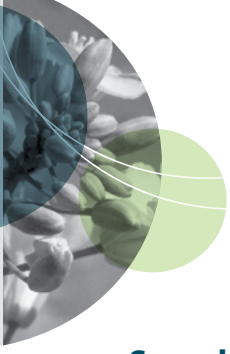
The NSW Department of Primary Industries would like to thank the staff of the Australian Oil Testing Laboratory at Wagga Wagga for their assistance in analysing these samples and compiling the book; their work is greatly appreciated. Thanks are also extended to Carey Martin (NSW DPI, Orange) for her hard work in formatting and reviewing the book.



Contents

Tables

Figures



Introduction

Sample analysis

Canola samples representing the 2020 harvest were received from GrainCorp Operations Limited (New South Wales and Victoria), Viterra Pty Ltd (South Australia) and CBH Group (Western Australia). These samples represent the seed collected at each receival point and have been taken to cumulatively represent the Australian harvest. Samples were received per site from New South Wales, South Australia and Victoria. Samples representing each of the four port zones were received from Western Australia. The NSW Department of Primary Industries (DPI) Oil Testing Service (OTS) has no control over sample collection and all data reported derives from analysing the provided samples. A single sample from the Goondiwindi West site in Queensland was submitted by GrainCorp Operations Limited. As this sample was not representative of the state, results have not been reported.

All averages reported are weighted, based on the tonnage represented.

Each sample was analysed for oil, protein and glucosinolate content; fatty acid profiles and volumetric grain weights according to the standard methods outlined in the methods section at the back of this book. The DPI OTS performed all analyses on the samples. Oil content is reported at 6% moisture in whole seed, protein content is reported in oil-free meal at 10% moisture, and glucosinolate content is reported in oil-free meal at 10% moisture.

The DPI OTS at Wagga Wagga prepared composite samples to determine chlorophyll content. Composite samples were prepared to represent GrainCorp's northern and southern New South Wales and Victorian regions and Viterra's Adelaide, Central, Eastern and Western regions in South Australia. Western Australia's four port zone samples were analysed as received from CBH. No samples were received from GrainCorp's northern NSW region. Composite samples were created on a per weight basis to proportionally represent each site.

Units of measurement

Unless otherwise stated, units of measurement are as follows:

Oil content – % oil, whole seed at 6% moisture

Protein content – % protein, oil-free meal at 10% moisture

Glucosinolate content – µmoles/g, oil-free meal at 10% moisture

Oleic acid (18:1) content – % of total fatty acids

Linoleic acid (18:2) content – % of total fatty acids

Linolenic acid (18:3) content – % of total fatty acids

Saturated fatty acids content – % of total fatty acids

Monounsaturated fatty acids content – % of total fatty acids

Polyunsaturated fatty acids content – % of total fatty acids

Chlorophyll content – mg/kg in whole seed, as received

Sustainability of Australian canola

The majority of Australian canola exports have, for many years, been certified as sustainable under one of two internationally recognised sustainability certification schemes, the International Sustainability and Carbon Certification (ISCC) and the Biomass Biofuels Sustainability Voluntary Scheme (2BSvs).

Sustainability certification has been a requirement of the European Union for all canola exports to the EU destined for the bioenergy market. Since sustainability certification began in 2009, over 18 million tonnes of certified sustainable canola have been supplied to the EU, valued at A$10.85 billion.

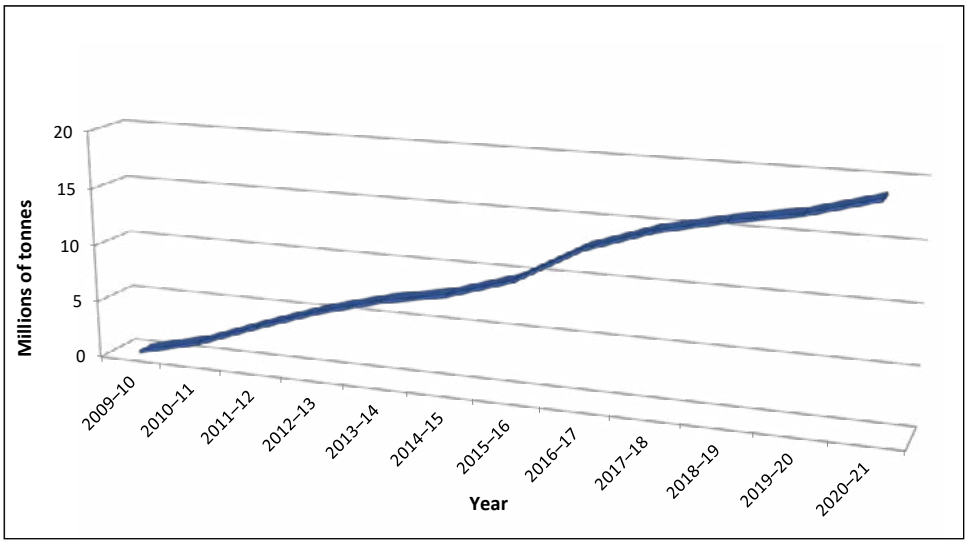


Figure 1. Certified sustainable canola exports to the EU (cumulative).

The success of Australian farmers to be able to supply certified sustainable canola has driven confidence within other markets to source high and consistent quality, certified sustainable Australian canola. From the 2020 harvest, over 2.6 million tonnes, representing over 60% of the crop, was traded as certified sustainable into the food and feed markets, in addition the European bioenergy market.

In 2020 all Australian sustainable canola has been certified under the ISCC scheme, providing assurance to the market with a consistent and rigorous certification scheme that is widely recognised and accepted across the value chain. The added benefit of the ISCC scheme is the equivalence with the Sustainable Agriculture Initiative, enabling the food and feed market to utilise oil and meal from certified sustainable Australian canola in order to assist them in meeting their corporate sustainability sourcing commitments.

Weather and production review

The 2020 growing season was a major turnaround from the 2019 drought year, especially in the eastern states, which recorded average to above average growing season rainfall (April–October) (figures 3 and 4) that followed early season rain in late February and March (Figure 2). In Western Australia, the season was characterised by below average rainfall and well below average in some regions. Rainfall for 1 April to 30 June was decile 5–9 (Figure 3) across most of south-eastern Australia with New South Wales and northern Victoria mostly decile 8–9, closer to decile 5 in South Australia and decile 2–5 in Western Australia. The seasonal break for New South Wales and Victoria arrived very early in autumn with good rain through March and April. In South Australia the break came in late April, but in Western Australia it was patchy, arriving in late May depending on region, and in some northern areas not until early June. From July through to the end of September, rainfall was decile 5–9 for most of NSW, decile 3–6 for Victoria, decile 3 for most of South Australia and decile 1–6 in Western Australia, closer to decile 6 in the southern region (Figure 4).

GOTO PAGES

Bureau of Meteorology (http://www.bom.gov.au/climate/maps/rainfall/?variable=rainfall&map=decile&period=3month&region=nat&year=2020&month=03&day=31)

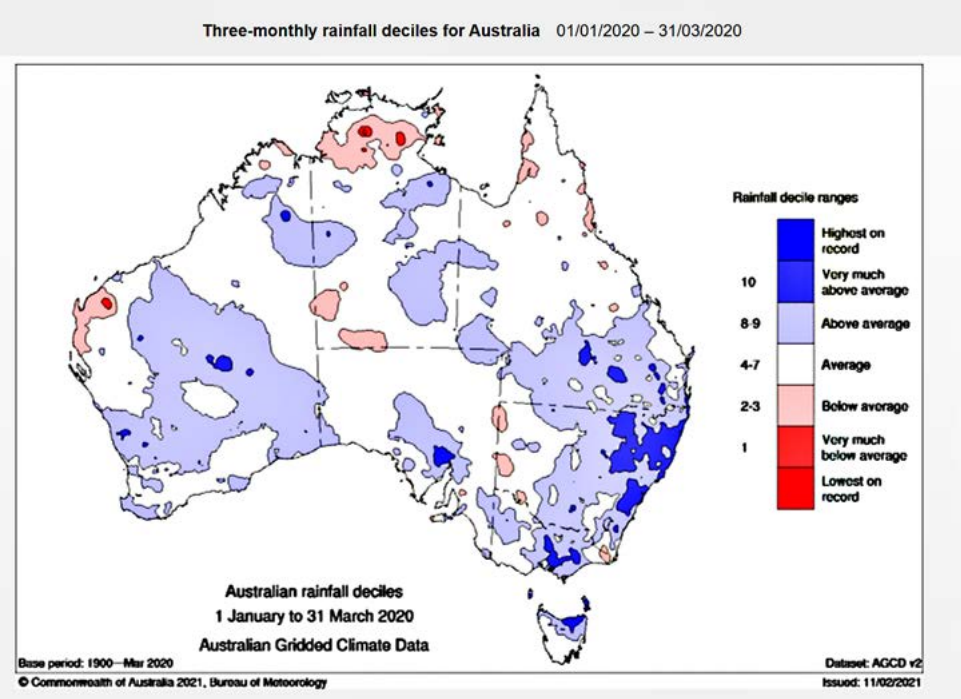


Figure 2. Australian rainfall deciles 1 January to 31 March 2020.
Source: Bureau of Meteorology

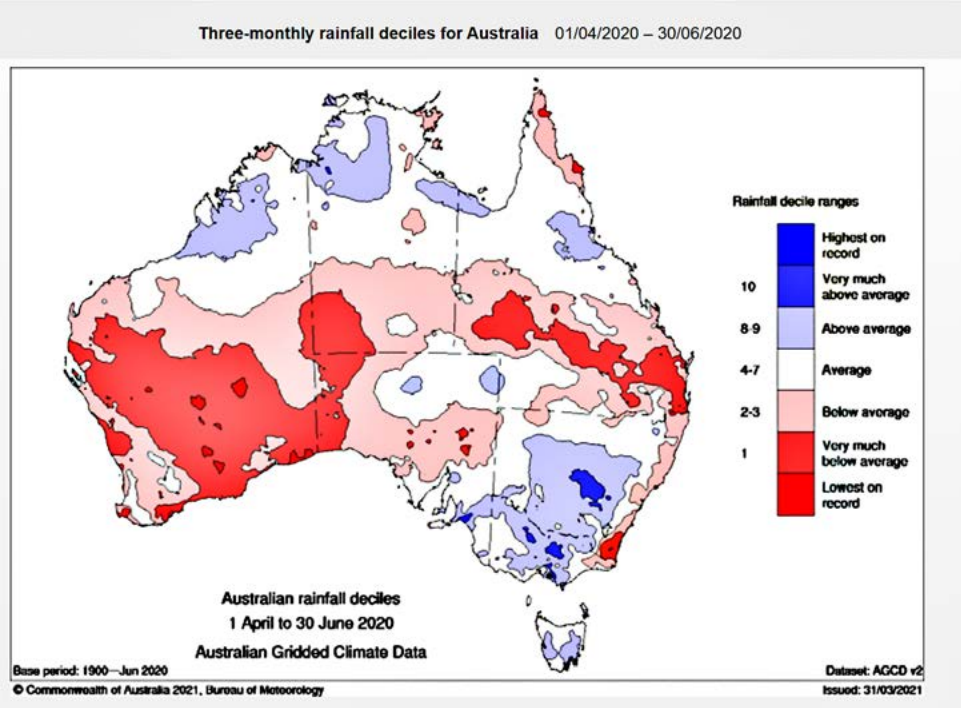


Figure 3. Australian rainfall deciles 1 April to 30 June 2020.
Source: Bureau of Meteorology

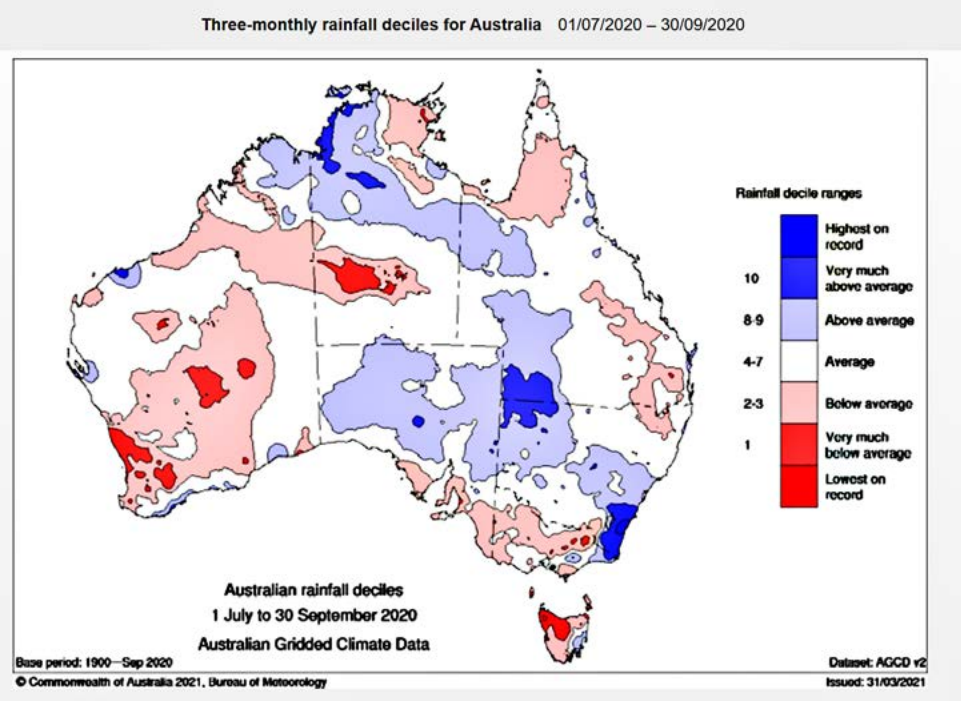


Figure 4. Australian rainfall deciles 1 July to 30 September 2020.
Source: Bureau of Meteorology

New South Wales

The canola crop area increased by 25% to an estimated 500,000 ha in 2020 following severe drought in 2019. In 2019 the harvest area was 60% smaller than the sown area due to crop failure where many crops were grazed out or abandoned .

The autumn break arrived early, starting in late February 2020 in the north of the state and continued through March and April. Most of the crop was sown by the end of April and established well. An estimated 60,000 ha of 'dual-purpose' winter canola was sown early for livestock feed following the drought. Slightly cooler than average growing conditions through April, May and June did not slow crop development due to the earlier than average sowing time.

Ideal crop growth, and good seasonal conditions prompted growers to apply more nitrogen to their crops to maximise yield potential. With a high yield potential, most crops in central and southern NSW received at least one preventative fungicide for sclerotinia stem rot and upper canopy blackleg. Rainfall was more variable in spring and a dry period between mid September and mid October in many areas reduced the need for a second fungicide spray. Heliothis and aphid pressure was generally low compared with 2019 with little treatment required.

Despite the typical range in oil contents observed every year, overall oil percentages were excellent, assisted by mild conditions through seed filling.

The final estimated production for NSW was 1,150,000 t from an estimated 500,000 ha for an average yield of 2.30 t/ha.

Victoria

The Victorian crop increased by 8% to an estimated 450,000 ha in 2020. The seasonal break came around the same time as New South Wales, in early March. Sowing started 1–2 weeks earlier than normal to take advantage of the ideal sowing conditions in mid April. Following good early rain July was very dry, August received average to slightly above average rainfall, and average to above average rainfall was recorded across most of the state in October. This rain and mild finishing conditions contributed to excellent yield potential and oil contents. Like New South Wales, growers applied more nitrogen to crops than they had previously to maximise the profit from the season. Management for the major diseases and insect pests was similar to New South Wales.

The final estimated production for Victoria was 1,030,000 t from an estimated 450,000 ha for an average yield of 2.29 t/ha.

South Australia

The area sown to canola has varied little over the past few years, estimated at 225,000 ha. Opening rains arrived around 25–26 April across most of the state, following light falls earlier in the month. The crop established well and responded to average rainfall through May. Rainfall was generally average to below average in June and below average to well below average in July. Following the mid winter dry period, spring rainfall was average to above average and without any major severe heat stress days yield potential was above average. Like New South Wales and Victoria, growers of high yield potential crops in higher rainfall districts applied a preventative fungicide, but at a lower frequency overall. Pest pressure was generally low throughout the season.

The final estimated production for South Australia was 386,000 t from an estimated 225,000 ha for an average yield of 1.72 t/ha.

Western Australia

Canola area increased 11% to 1,105,000 ha in 2020. The main seasonal break in late May was again late, but earlier than the previous year. Severe wind damage caused problems in crop establishment from sowing furrows filling with soil that thinned many stands to less than 10 plants per square metre. Most canola was grown in the traditional medium and high rainfall zones. Rainfall was extremely variable across the cropping zone through June and July, being mostly average to below average, and in some regions of the centre and south well below average at decile 1–2. Higher than average temperatures through winter pushed plant development faster and crops started flowering earlier than in the previous 3–4 years.

Rainfall was again variable through August and September ranging from decile 2 right through to decile 9 in southern coastal districts, which boosted yield potential in those areas. October was dry, but most crops had set their yield by then. Considering the general lack of growing season rainfall, state production and oil contents were much higher than expected. Where the rain did fall during crop growth, it fell at the right time to maintain or improve yield potential. Pest pressure was generally low with a greater concentration in moisture-stressed crops, as expected. Disease pressure was also generally low, but some crops were treated for sclerotinia stem rot.

The final estimated production for Western Australia was 1.71 million tonnes from an estimated 1,105,000 ha for an average yield of 1.55 t/ha.

Yield

Australia produced an estimated 4.28 million tonnes of canola in 2020 from a harvested area of 1.2 million hectares for an average yield of 1.88 t/ha. State yields ranged from 1.55 t/ha in Western Augtalia to 2.30 t/ha New South Wales.

The national crop area increased by 11% on 2019, while production rose 85% due to average to well above average yields across all states, primarily in eastern Australia. National production was the second highest on record – 40,000 tonnes less than the record 2016 harvest. Productivity measured as tonnes per hectare was the highest on record. The area sown, and production, in each state is shown in Table 1.

GOTO PAGES

ABARES (https://www.agriculture.gov.au/abares/research-topics/agricultural-commodities/ausbotralian-crop-report)

GIWA (https://www.giwa.org.au/wa-crop-reports/2020-season/)

Lachstock (https://www.lachstockconsulting.com.au/)

Table 1. Estimated Australian canola production by state in 2020.

State	Area sown (hectares)	Production (tonnes)	Average yield (tonnes/hectare)
New South Wales	500,000	1,150,000	2.30
South Australia	225,000	386,000	1.72
Victoria	450,000	1,030,000	2.29
Western Australia	1,105,000	1,710,000	1.55
Australia	2,280,000	4,276,000	1.88

Source: ABARES Crop Report February 2021; GIWA Crop Report February 2021; Lachstock Consulting: industry estimates

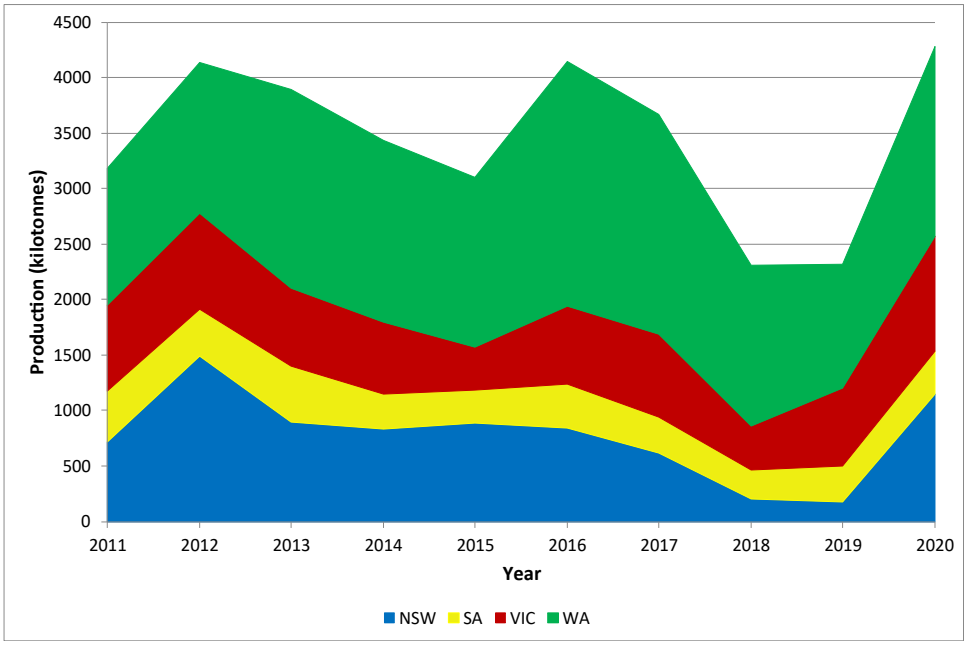
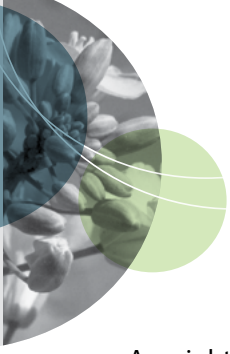


Figure 5. Canola production in Australia 2011–2020.



Australian quality parameter summary

A weighted average of each region and state was calculated based on the tonnages each site and grade represents.

The Australian national weighted average was calculated using the production figures for each state.

Due to tonnages being confidential information, individual site tonnages cannot be reported.

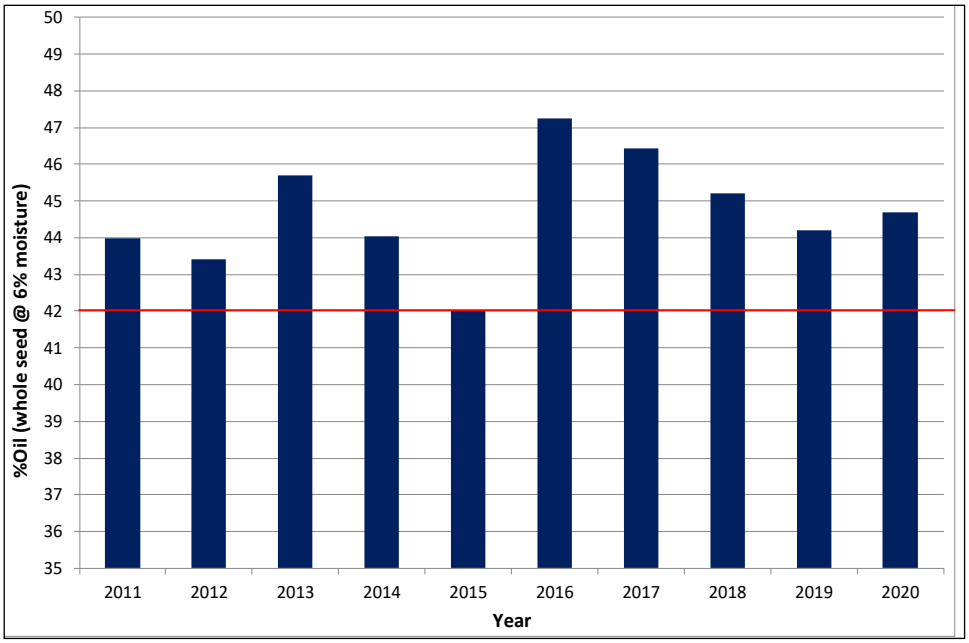
Table 2. Average quality of Australian canola 2020.

Quality parameter	Australian weighted average
Oil content, % in whole seed @ 6% moisture	44.7
Protein content, % in oil-free meal @ 10% moisture	38.3
Glucosinolates, µmoles/g in oil-free meal @ 10% moisture	10
Test weight, kg/hL	67.2
Oleic acid (C18:1), %[1]	61.0
Linoleic acid (C18:2), % [1]	19.8
Linolenic acid (C18:3), % [1]	10.2
Erucic acid (C22:1), % [1]	<0.1
Polyunsaturated fatty acids, % [1]	30.0
Monounsaturated fatty acids, % [1]	62.7
Saturated fatty acids, % [1]	7.3
Iodine value	114.7
Chlorophyll content, mg/kg in whole seed as received	4

[1]Fatty acids are reported as a % of total fatty acids.

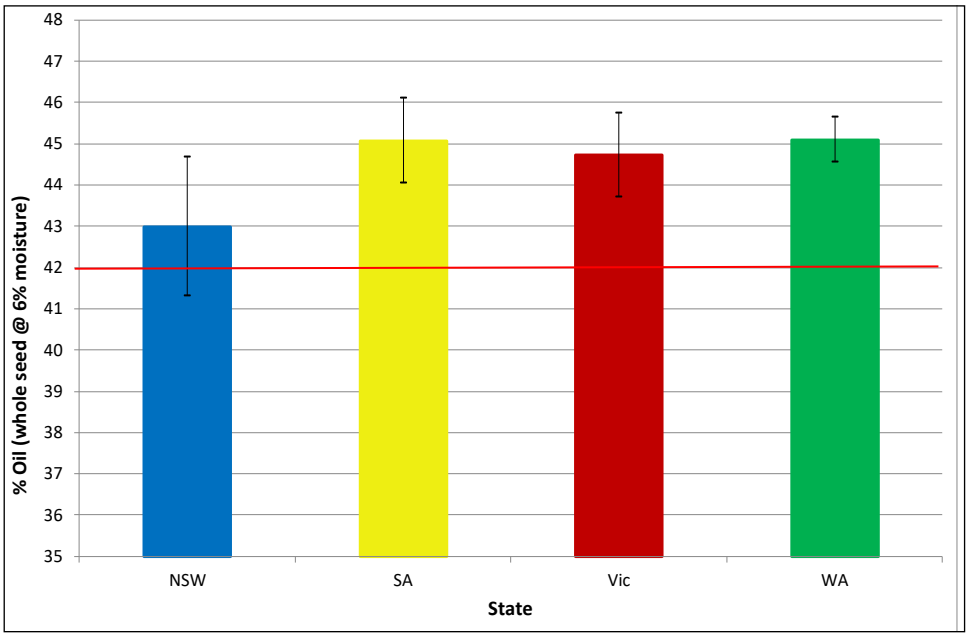
Oil content

The average oil content for the Australian harvest in 2020 was 44.7%. This was 0.5 percentage points higher than the 2019 harvest. The receival site oil content ranged from 39.9% at Nevertire in New South Wales to 46.2% at Frances, Port Giles and Port Lincoln, all in South Australia. The port zone oil content ranged from 44.3% at Geraldton in Western Australia to 45.6% at Albany in Western Australia.



2015 average was determined with NSW, SA and Vic results only.
Red line indicates the AOF base level oil content of 42%.

Figure 6. Average Australian oil content 2011–2020.

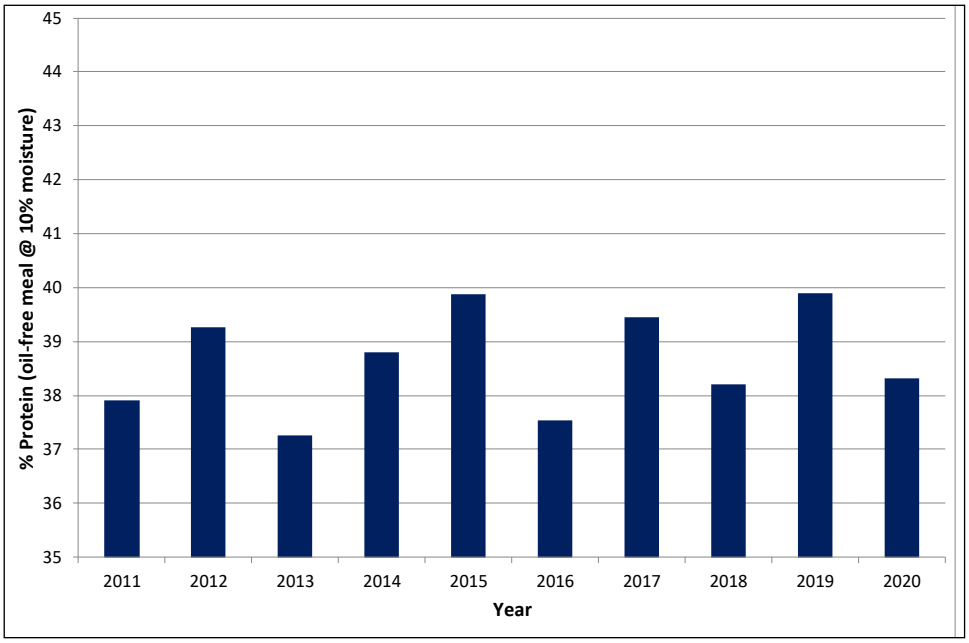


Bars indicate the standard deviation for each state
Red line indicates the AOF base level oil content of 42%.

Figure 7. Average oil content by state 2020.

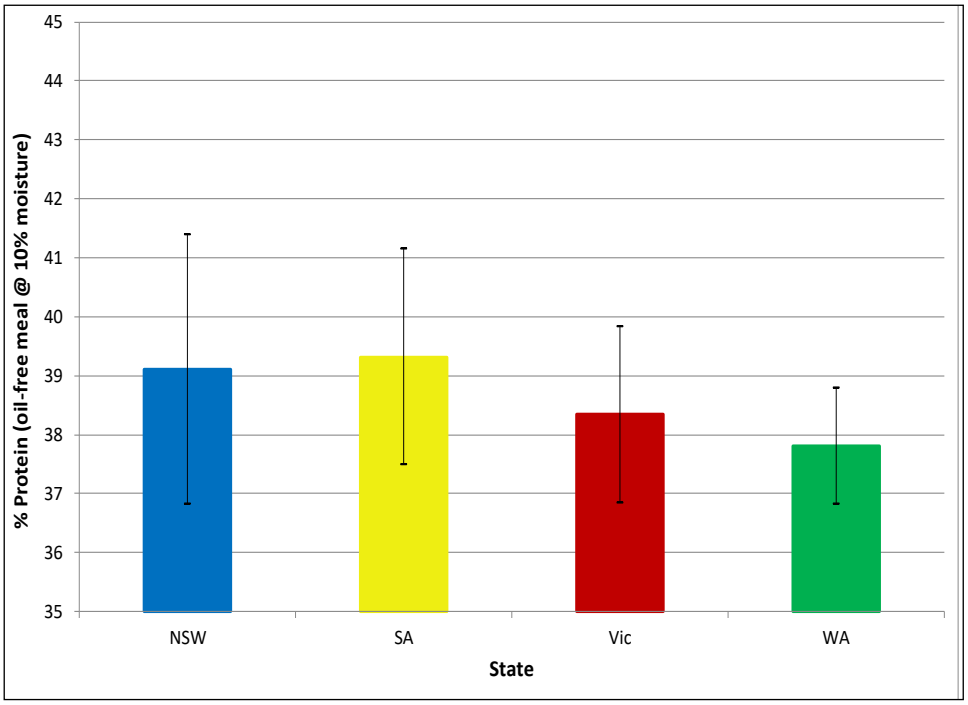
Protein content – meal

The average protein content for the 2020 Australian canola harvest was 38.3%, a decrease of 1.6 percentage points from the 2019 harvest. Protein ranged from 33.8% at Frances in South Australia to 44.4% at Moree Sub in New South Wales. The port zone protein content ranged from 36.9% at Albany to 39.1% at Kwinana, both in Western Australia.



2015 average was determined with NSW, SA and Vic results only.

Figure 8. Average Australian protein content 2011–2020.



Bars indicate the standard deviation for each state.

Figure 9. Average protein content by state 2020.

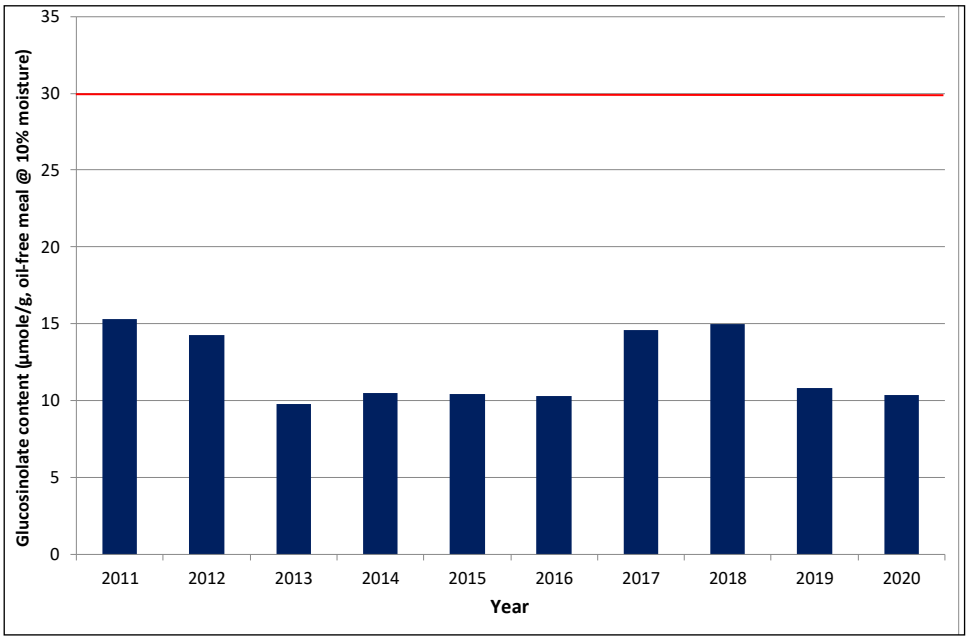
Glucosinolate content – meal

The Australian Oilseeds Federation (AOF) Trade Standard sets the limit for glucosinolate content at 30 µmoles/g, oil-free meal. Glucosinolate content has been reported as µmoles/g, oil-free meal at 10% moisture to allow comparison with the AOF Trade Standard.

The average glucosinolate content for the Australian harvest in 2020 was 10 µmoles/g. This was a decrease of 1 µmoles/g from the 2019 harvest. The receival site glucosinolate content ranged from 4 µmoles/g at Boree Creek in New South Wales, to 23 µmoles/g at Henty West in New South Wales.

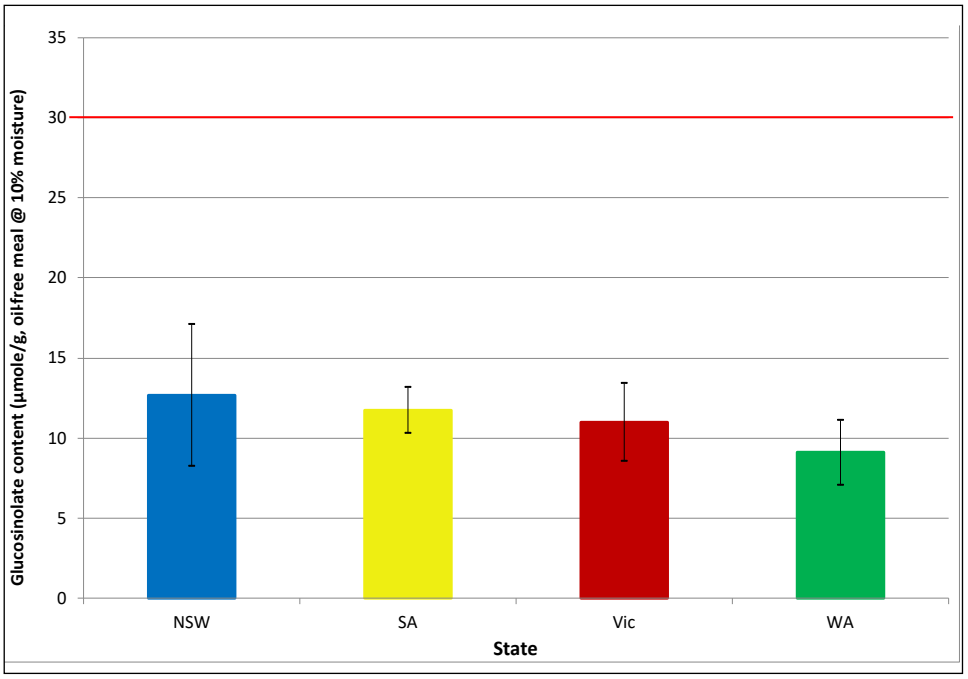
GOTO PAGES

The Australian Oilseeds Federation (AOF) Trade Standard (http://www.australianoilseeds.com/Technical_Info/standards_manual)



2014 and 2015 averages were determined with NSW, SA and Vic results only.
Red line indicates the AOF limit of 30 µmoles/g in oil-free meal.

Figure 10. Average Australian glucosinolate content in meal 2011–2020.

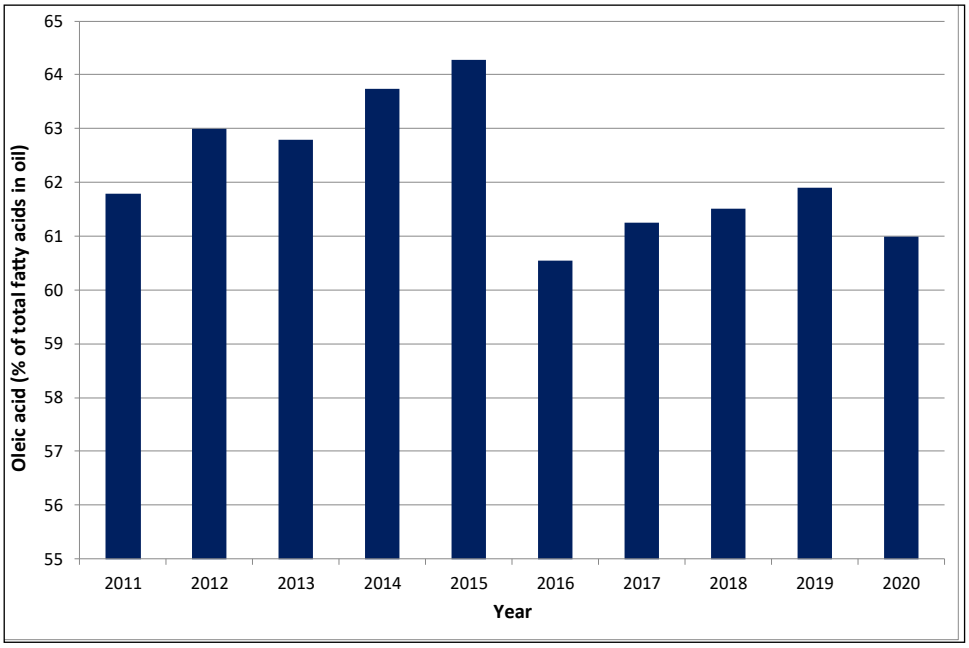


Bars indicate the standard deviation for each state.
Red line indicates the AOF limit of 30 µmoles/g in oil-free meal.

Figure 11. Average glucosinolate content in meal by state 2020.

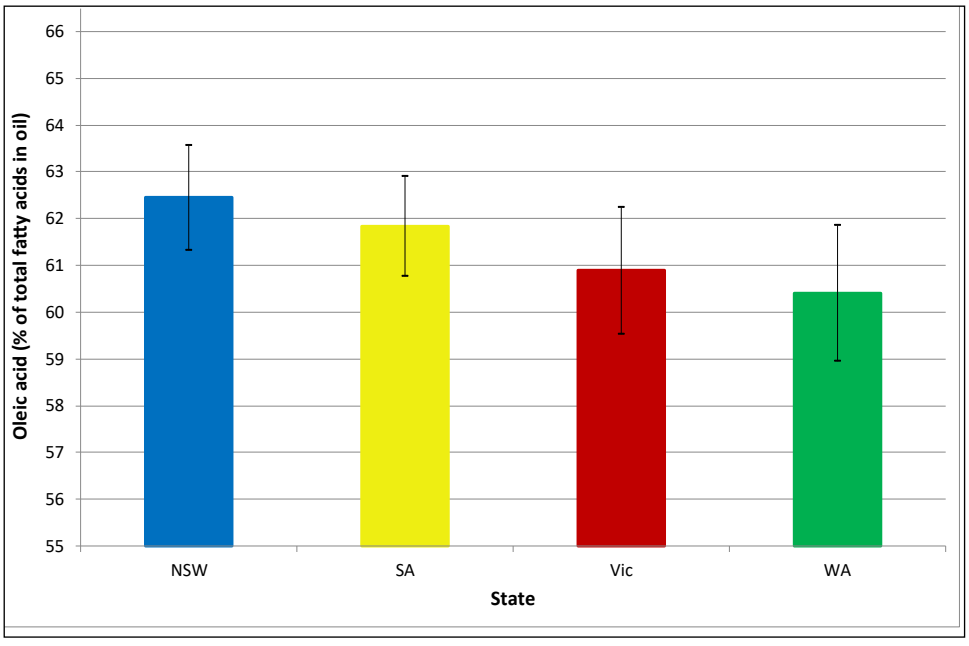
Oleic acid

The average Australian oleic acid (C18:1) content from the 2020 harvest was 61.0% This was a decrease of 0.9 percentage points from the 2019 season. Oleic acid ranged from 58.4% at Esperance in Western Australia to 66.7% at Tandarra in Victoria.



2014 and 2015 averages were determined with NSW, SA and Vic results only.

Figure 12. Average Australian percentage of oleic acid in canola oil 2011–2020.

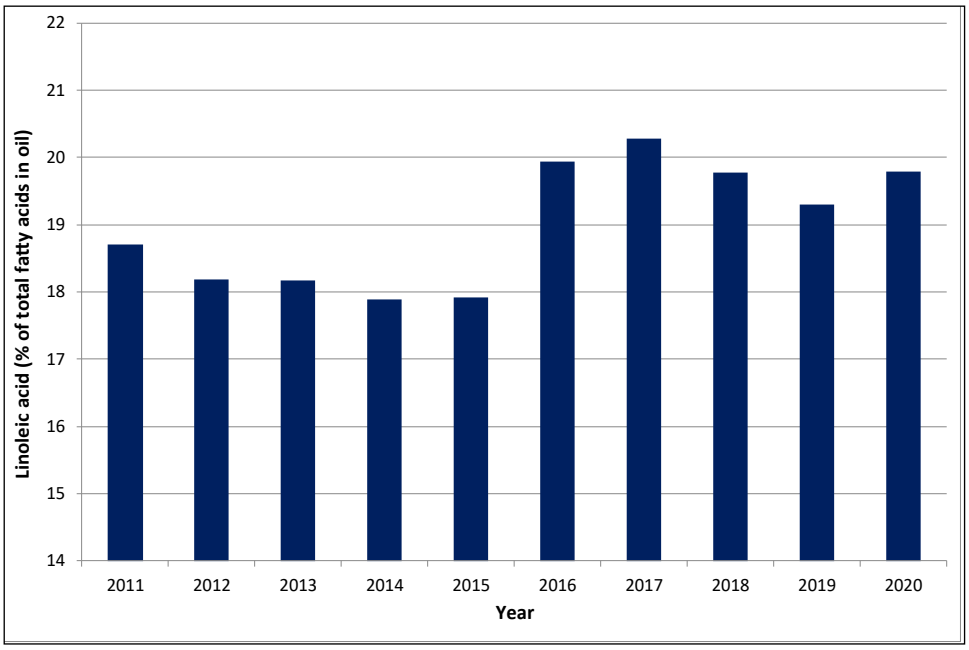


Bars indicate the standard deviation for each state.

Figure 13. Average percentage of oleic acid in canola oil by state 2020.

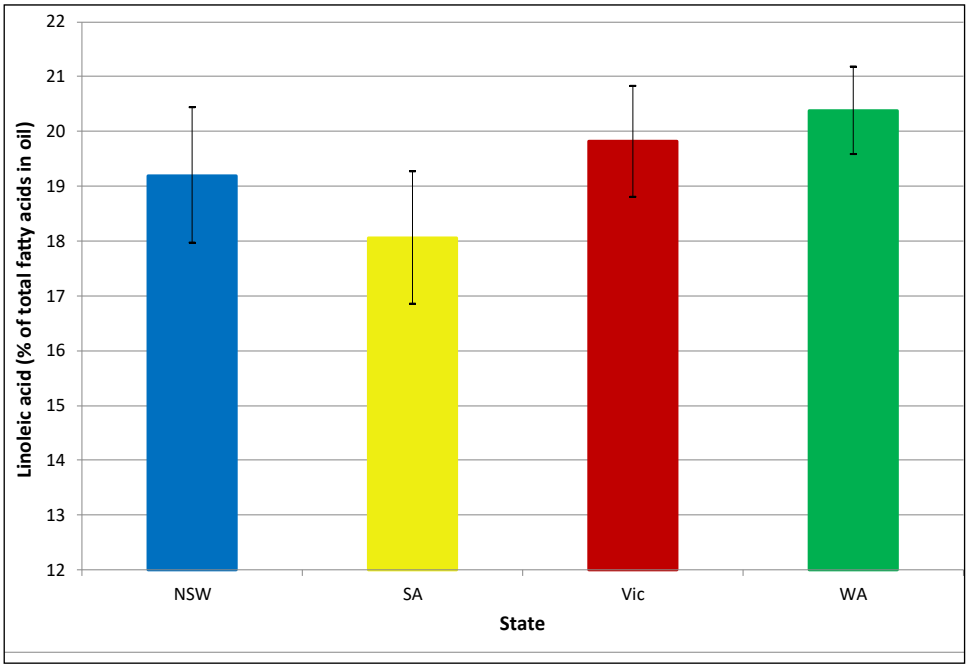
Linoleic acid

The average Australian linoleic acid (C18:2) content from the 2020 harvest was 19.8%. This was an increase of 0.5 percentage points from the 2019 season. Linoleic acid ranged from 16.2% at Moree Sub in New South Wales to 21.6% at Esperance in Western Australia.



2014 and 2015 averages were determined with NSW, SA and Vic results only.

Figure 14. Average Australian percentage of linoleic acid in canola oil 2011–2020.

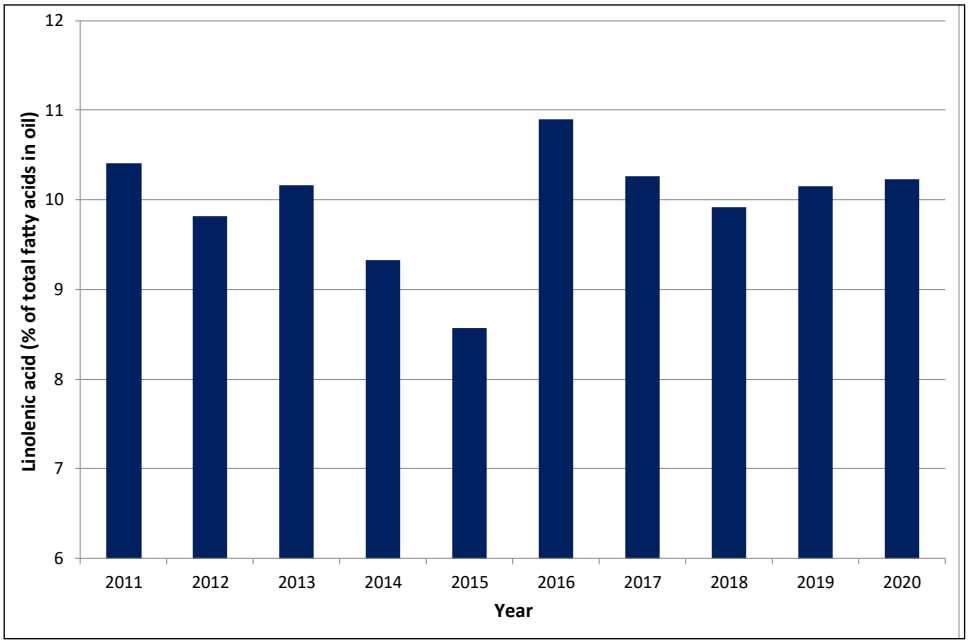


Bars indicate the standard deviation for each state.

Figure 15. Average percentage of linoleic acid in canola oil by state 2020.

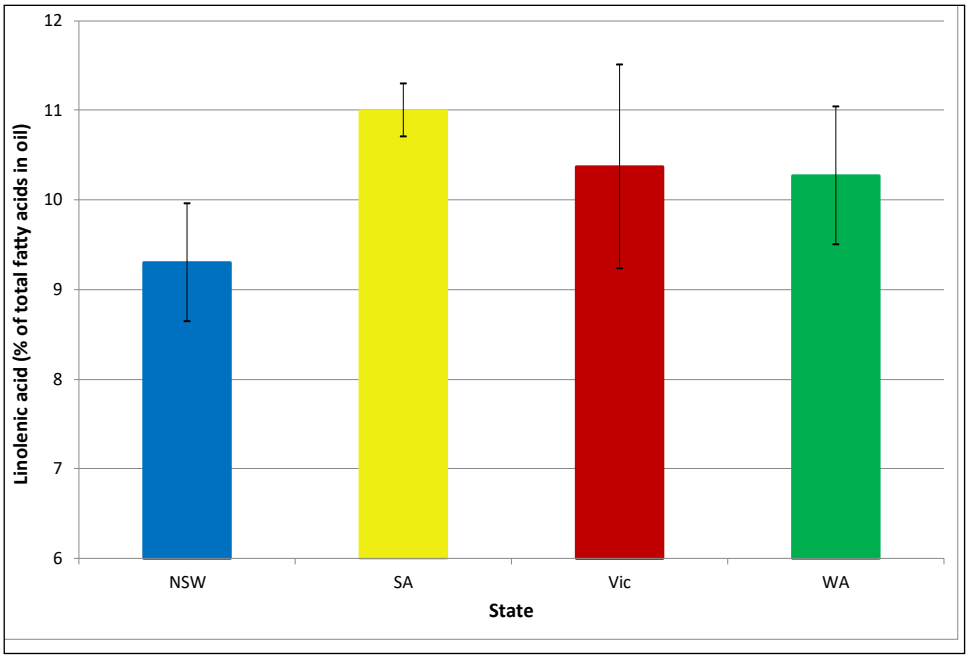
Linolenic acid

The average Australian linolenic acid (C18:3) content from the 2020 harvest was 10.2%. This remained stable from the 2019 season. Linolenic acid ranged from 4.6% at Tandarra in Victoria to 11.4 % at Tailem Bend in South Australia.



2014 and 2015 averages were determined with NSW, SA and Vic results only.

Figure 16. Average Australian percentage of linolenic acid in canola oil 2011–2020.

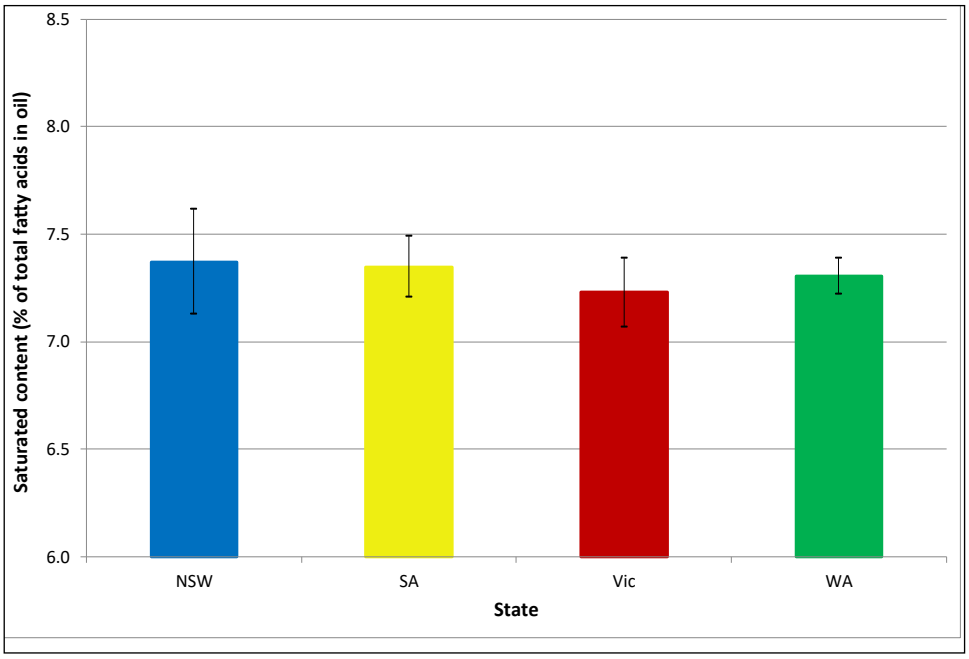


Bars indicate the standard deviation for each state.

Figure 17. Average percentage of linolenic acid in canola oil by state 2020.

Saturated fatty acids

The average Australian saturated fatty acids content from the 2020 harvest was 7.3%. This was an increase of 0.3 percentage points from the 2019 season of 7.0%. Saturated fatty acids ranged from 6.9% at Murchison East in Victoria to 7.8% at Willow Tree and Werris Creek Sub in New South Wales.

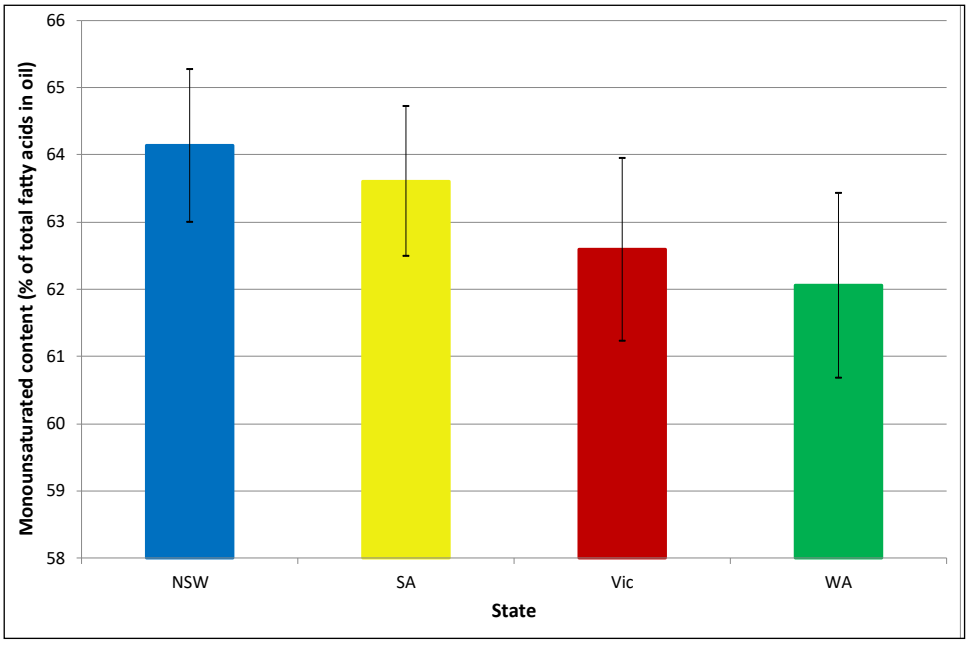


Bars indicate the standard deviation for each state.

Figure 18. Average percentage of saturated fatty acids in canola oil by state 2020.

Monounsaturated fatty acids

The average Australian monounsaturated fatty acids content from the 2020 harvest was 62.7%. This was a decrease of 0.8 percentage points from the 2019 harvest of 63.5%. Monounsaturated fatty acids ranged from 60.1% at Esperance in Western Australia to 68.4% at Tandarra in Victoria

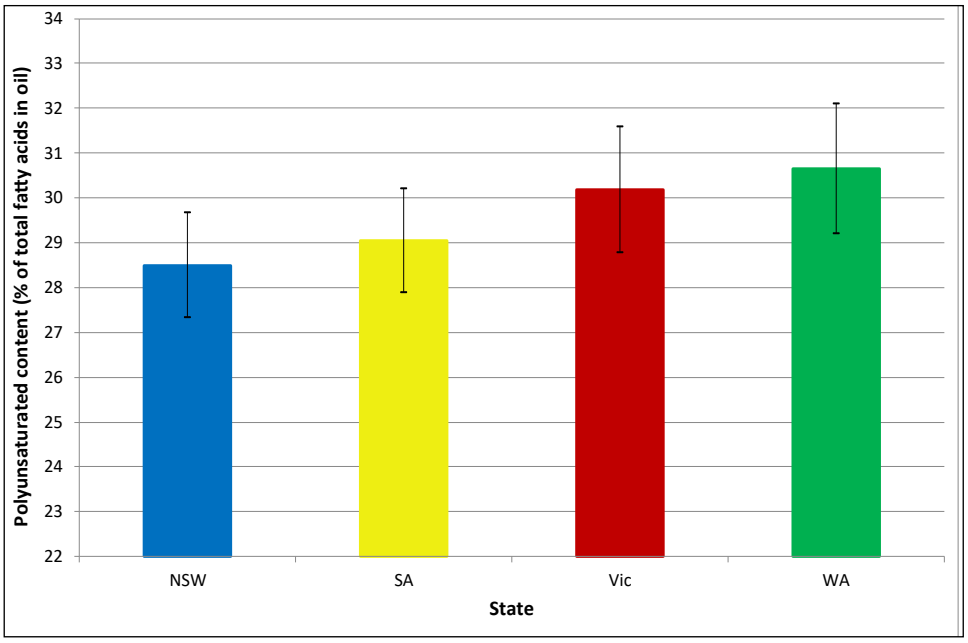


Bars indicate the standard deviation for each state.

Figure 19. Average percentage of monounsaturated fatty acids in canola oil by state 2020.

Polyunsaturated fatty acids

The average Australian polyunsaturated fatty acids content from the 2020 harvest was 30.0%. This was an increase of 0.5 percentage points from the 2019 harvest of 29.5%. Polyunsaturated fatty acids ranged from 24.3% at Tandarra in Victoria to 32.7% at Esperance in Western Australia.

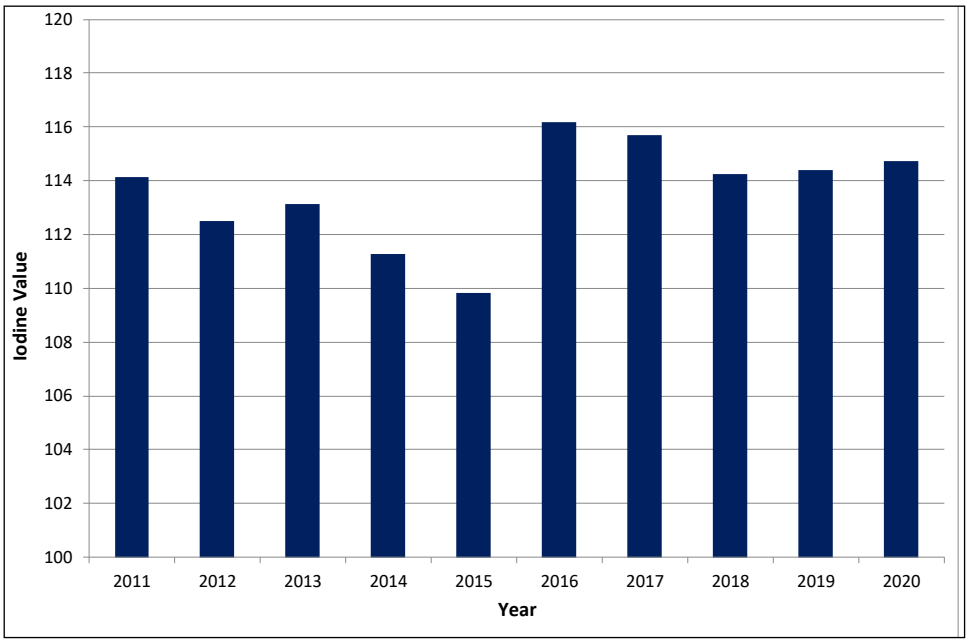


Bars indicate the standard deviation for each state.

Figure 20. Average percentage of polyunsaturated fatty acids in canola oil by state 2020.

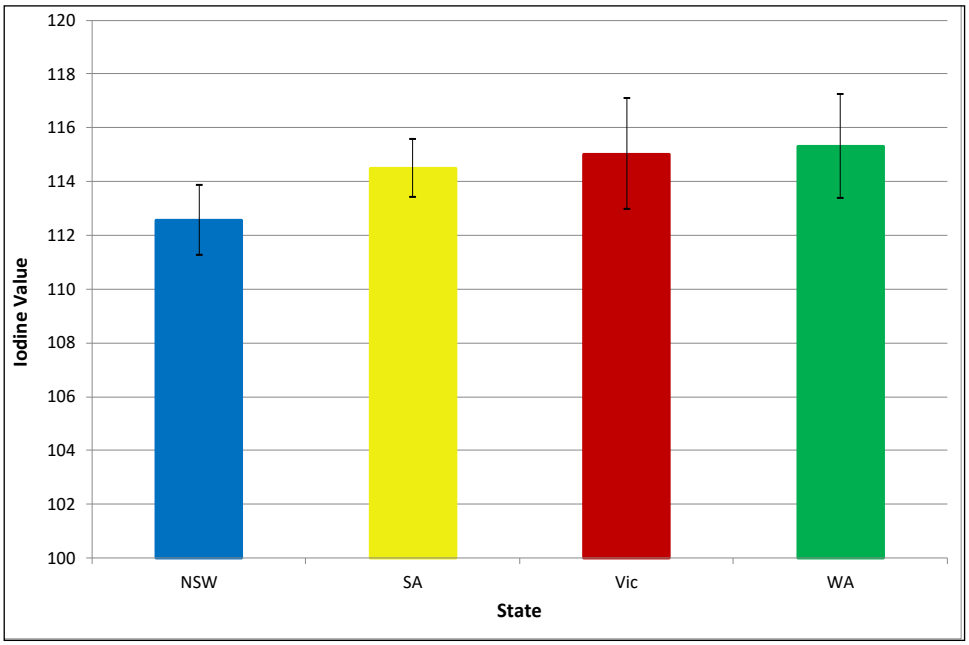
Iodine value

The average Australian iodine value in the oil portion of the seed from the 2020 harvest was 114.7. This was an increase of 0.3 from the 2019 harvest of 114.4. The iodine value ranged from 104.7 at Tandarra in Victoria to 117.9 at Esperance in Western Australia.



2014 and 2015 averages were determined with NSW, SA and Vic results only.

Figure 21. Average Australian iodine value in canola oil 2011–2020.

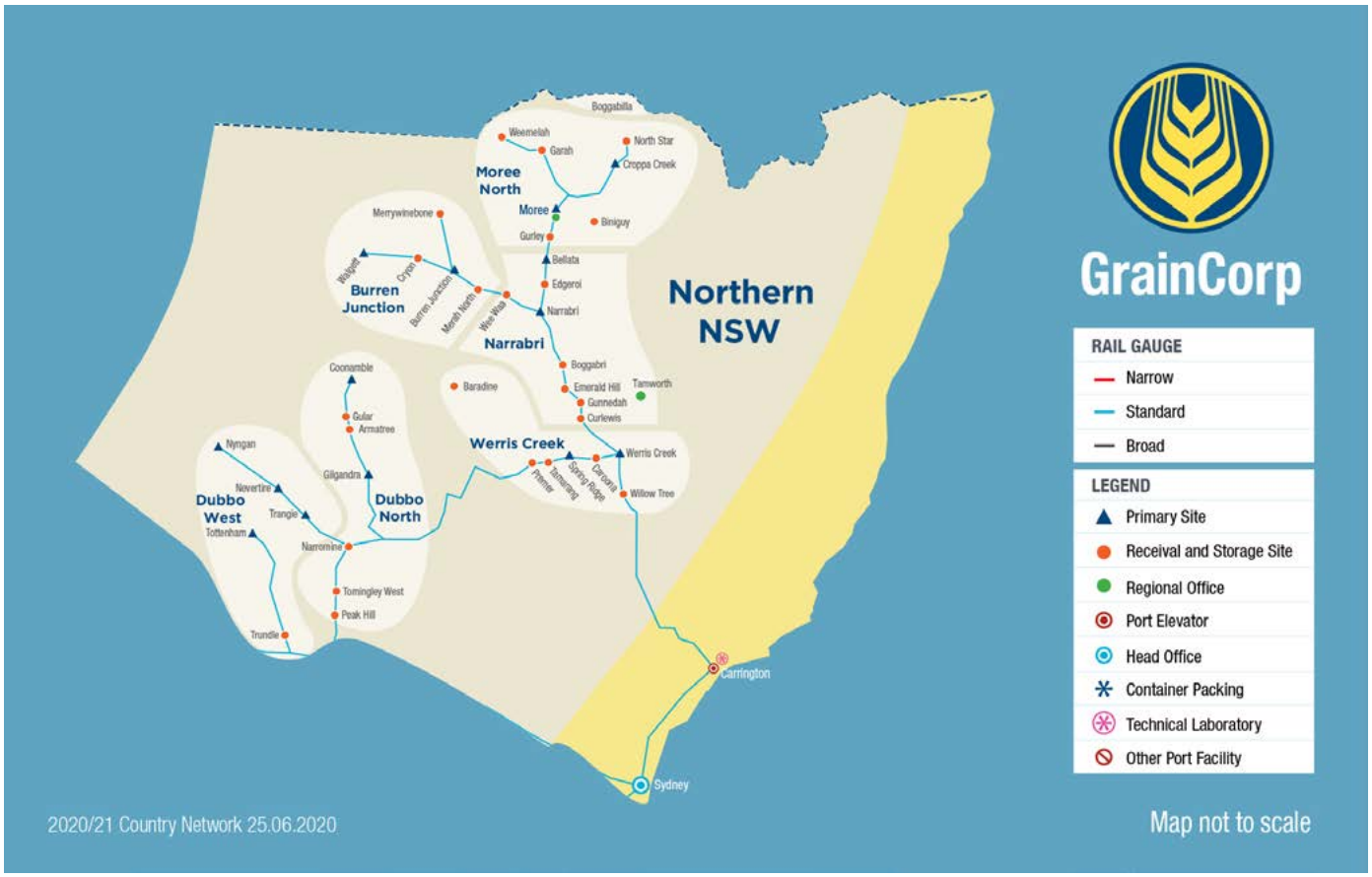


Bars indicate the standard deviation for each state.

Figure 22. Average iodine value in canola oil by state 2020.

Receival sites by state

In each state the bulk handlers group the receival sites into Zones and Regions. Results are reported according to these Zones and Regions.

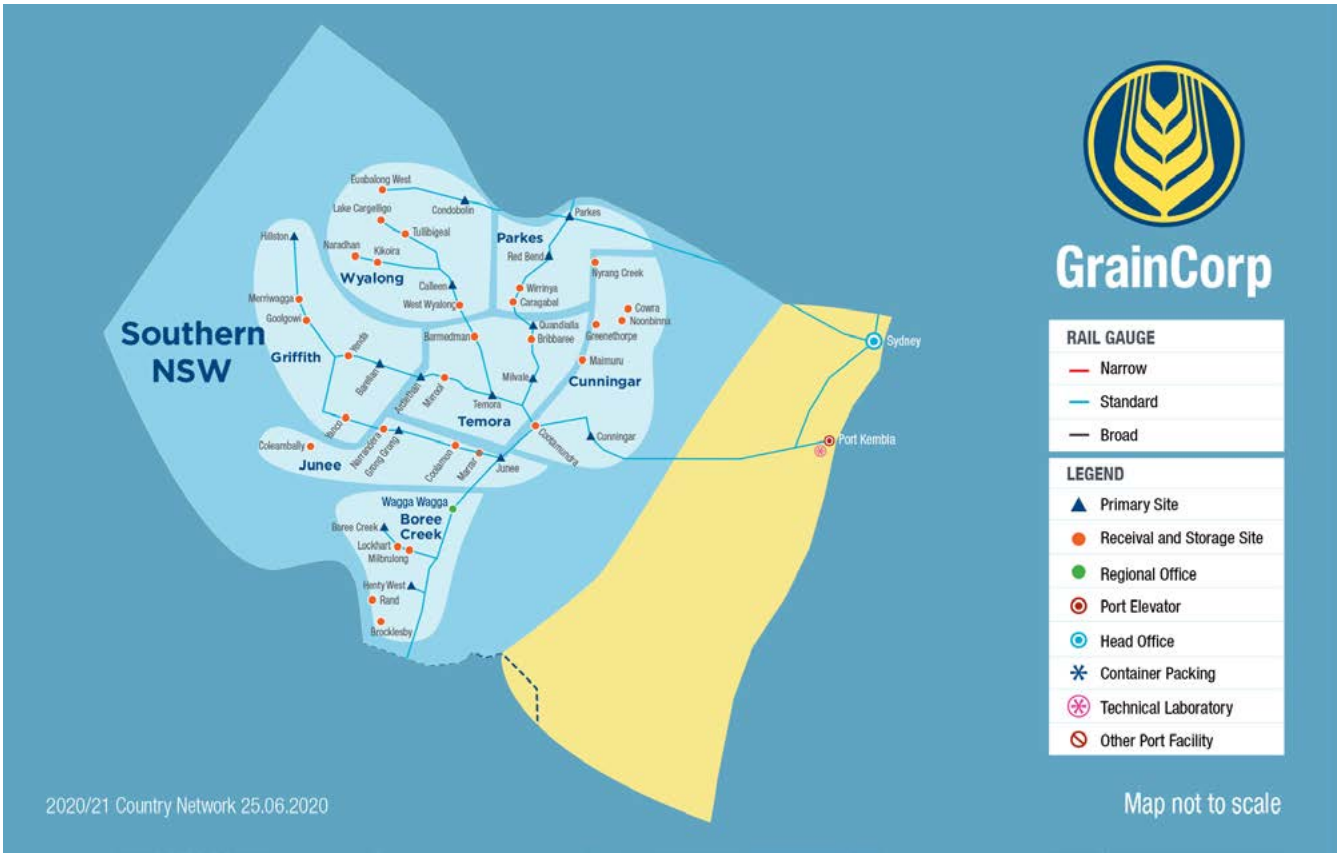


Source: GrainCorp

Figure 23. 2020–2021 GrainCorp Country Network map of northern NSW regions.

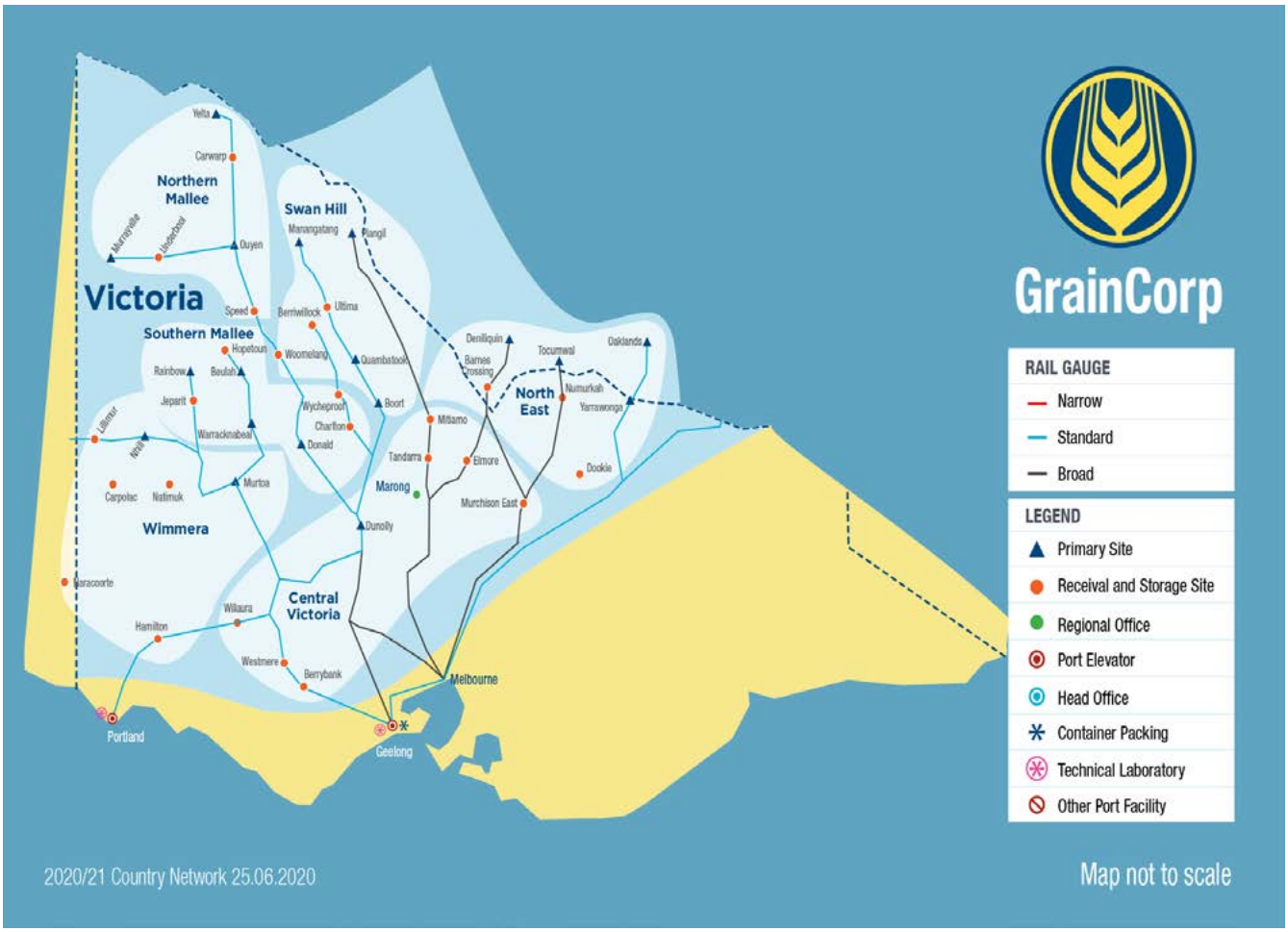
GOTO PAGE

GrainCorp (https://grains.graincorp.com.au/?s=network+map)



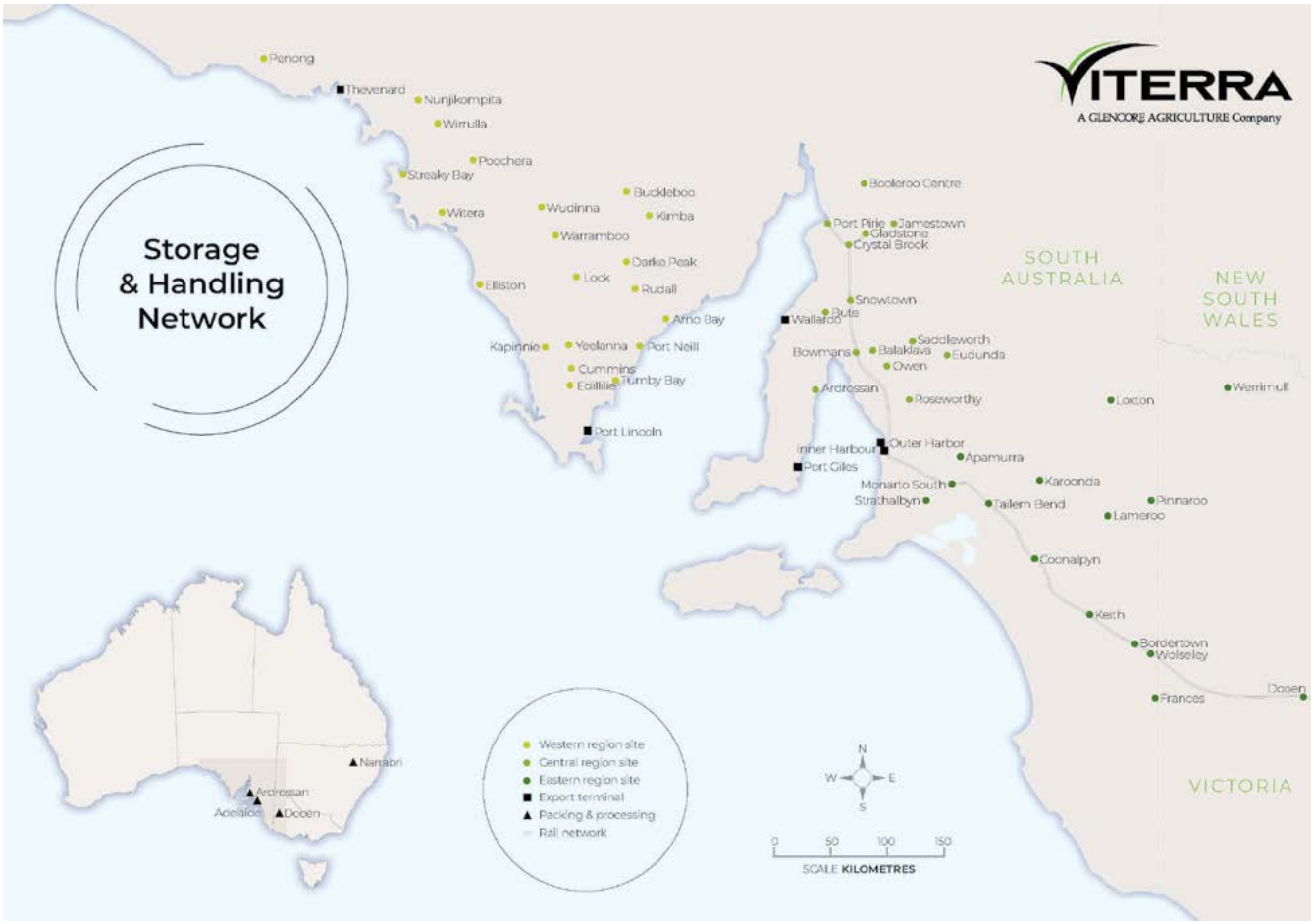
Source: GrainCorp

Figure 24. 2020–2021 GrainCorp Country Network map of southern NSW regions.



Source: GrainCorp

Figure 25. 2020–2021 GrainCorp Country Network map of Victorian regions.

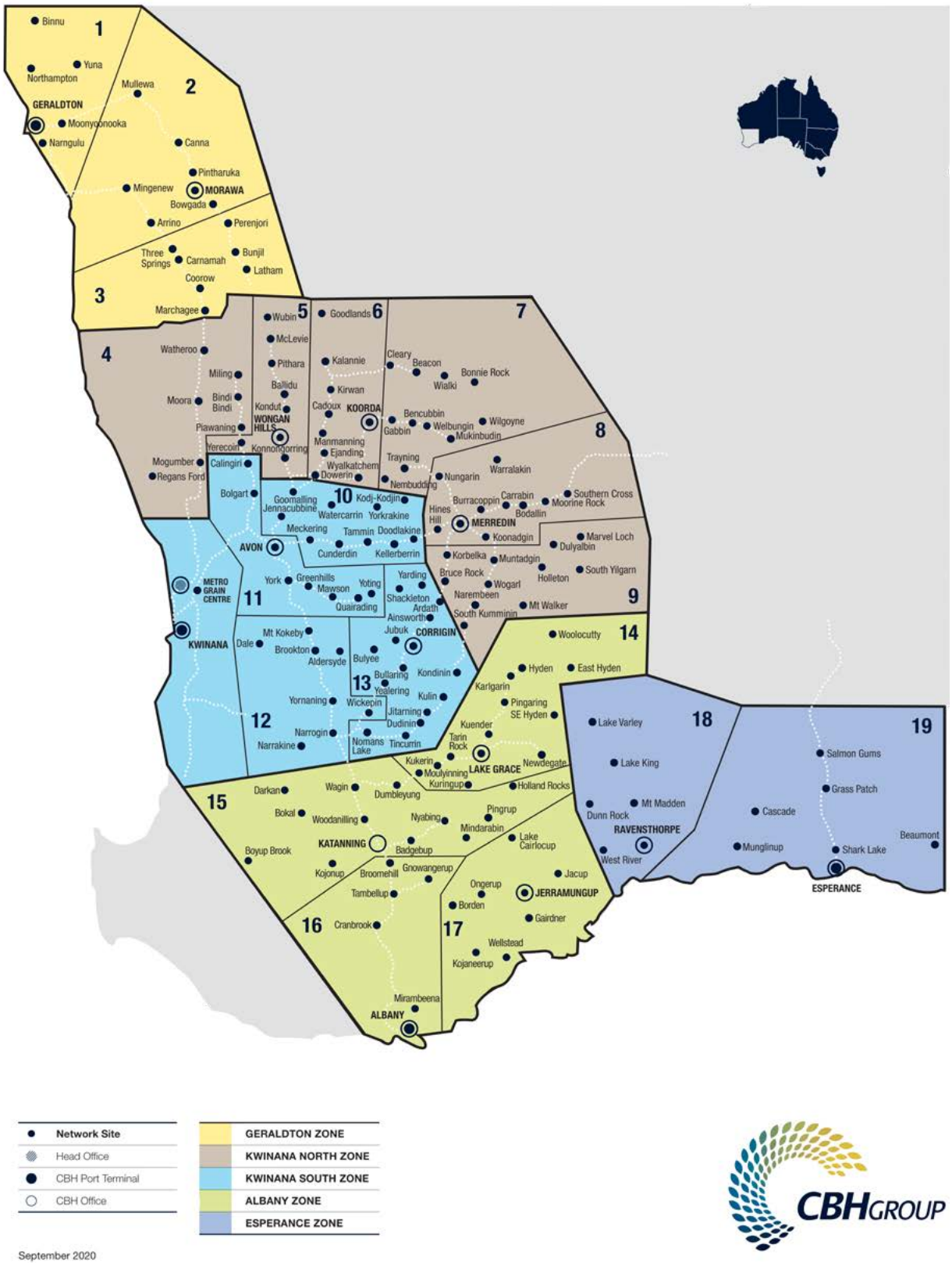


Source: Viterra

Figure 26. Viterra storage and handling network map.

GOTO PAGE

Viterra
(https://www.viterra.com.au/)

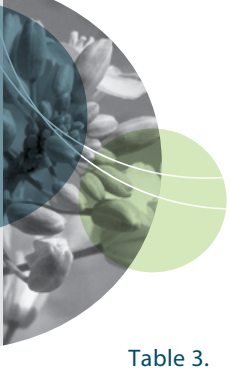


Source: CBH Group

Figure 27. CBH receival sites network map.

GOTO PAGES

CBH Group
(https://www.cbh.com.au/)



Quality data by state

Table 3. Quality data – New South Wales.

Region/zone/site	Grade	Oil	Protein	Glucosinolates	Test weight
		%[1]	%[2]	µmoles/g[3]	kg/hL[4]
Northern NSW					
Dubbo North					
Gilgandra	CAN	40.2	43.0	8	68.38
Dubbo West					
Nevertire	CAN	39.9	42.6	9	68.75
Trangie	CAN	40.3	41.9	11	68.25
Trundle	CAN	41.0	40.2	10	68.63
Moree North					
Moree Sub	CAN	40.7	44.4	9	68.00
Narrabri					
Gunnedah	CAN	40.2	42.8	13	69.50
Werris Creek					
Willow Tree	CAN	40.0	43.2	9	67.38
Premer	CAN	40.5	42.7	11	67.75
Werris Creek Sub	CAN	41.4	41.8	9	68.00
Northern NSW weighted average		**40.4**	**42.7**	**10**	**68.23**
Southern NSW					
Boree Creek					
Boree Creek	CAN	45.3	38.9	4	67.50
Henty West	CAN	43.0	36.0	23	66.63
Lockhart	CAN	43.6	38.9	11	67.50
Milbrulong	CAN	44.9	39.2	11	67.00
Cunningar					
Cootamundra	CAN	44.8	36.1	20	67.00
Cowra	CAN	44.7	37.7	18	66.00
Cunningar	CAN	45.4	35.2	19	66.75
Greenethorpe	CAN	44.6	38.1	12	67.00
Maimuru	CAN	45.3	34.8	16	65.50
Griffith					
Barellan	CAN	41.9	39.8	8	67.75
Goolgowi	CAN	41.6	39.6	13	67.00
Junee					
Coolamon	CAN	43.6	39.3	11	67.00
Grong Grong	CAN	43.0	41.3	7	68.13
Junee Sub	CAN	43.2	37.1	18	66.00
Narrandera	CAN	42.9	40.8	11	67.75
Parkes					
Caragabal	CAN	41.1	40.8	15	68.00
Parkes Sub	CAN	42.0	40.1	19	65.13
Red Bend	CAN	42.6	40.5	9	67.38
Temora					
Ardlethan	CAN	43.1	39.5	9	67.92
Bribbaree	CAN	43.1	39.5	9	67.25
Milvale	CAN	43.7	38.8	11	67.25
Quandialla	CAN	42.0	40.8	7	67.50
Temora Sub	CAN	42.9	39.5	7	67.50
Wyalong					
Calleen	CAN	41.6	40.9	5	68.00
Condobolin	CAN	41.6	40.9	10	68.00
Wyalong	CAN	42.8	38.9	10	67.50
Southern NSW weighted average		**43.6**	**38.3**	**13**	**66.99**
NSW weighted average		**43.0**	**39.1**	**13**	**67.21**
NSW minimum		**39.9**	**34.8**	**4**	**65.13**
NSW maximum		**45.4**	**44.4**	**23**	**69.50**

[1] % in whole seed @ 6% moisture
[2] % in oil-free meal @ 10% moisture
[3] µmoles/g in oil-free meal @ 10% moisture
[4] kilograms/ hectolitre.

Table 4. Quality data – South Australia.

Region/zone/site	Grade	Oil	Protein	Glucosinolates	Test weight
		%[1]	%[2]	µmoles/g[3]	kg/hL[4]
Adelaide					
Port Adelaide	CANO	44.7	39.8	13	66.50
Adelaide weighted average		**44.7**	**39.8**	**13**	**66.50**
Central					
Bowmans	CANO	44.9	40.1	11	67.00
Gladstone	CANO	44.7	39.4	13	66.25
Port Giles	CANO	46.2	39.0	10	66.25
Roseworthy	CANO	44.7	39.2	13	66.50
Central weighted average		**45.0**	**39.5**	**12**	**66.58**
Eastern					
Bordertown	CANO	44.2	39.2	12	67.75
Dooen	CANO	44.0	38.0	9	67.25
Edillilie	CANO	45.1	40.0	11	67.00
Frances	CANO	46.2	33.8	12	66.50
Keith	CANO	45.1	38.4	9	67.00
Tailem Bend	CANO	45.3	38.7	12	67.00
Wolseley	CANO	44.5	37.7	11	67.63
Eastern weighted average		**45.0**	**38.4**	**11**	**67.12**
Western					
Cummins	CANO	44.8	39.9	12	67.50
Pt Lincoln	CANO	46.2	39.3	11	67.00
Rudall	CANO	41.9	42.7	14	67.38
Tumby Bay	CANO	44.7	40.7	10	62.25
Western weighted average		**45.2**	**39.8**	**12**	**67.26**
SA weighted average		**45.1**	**39.3**	**12**	**67.01**
SA minimum		**41.9**	**33.8**	**9**	**66.25**
SA maximum		**46.2**	**42.7**	**14**	**67.75**

[1] % in whole seed @ 6% moisture
[2] % in oil-free meal @ 10% moisture
[3] µmoles/g in oil-free meal @ 10% moisture
[4] kilograms/ hectolitre.

Table 5. Quality data – Victoria.

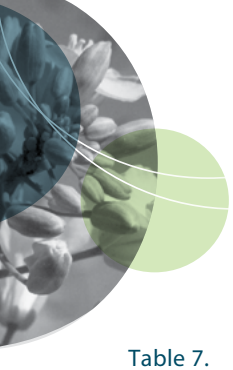
Region/zone/site	Grade	Oil	Protein	Glucosinolates	Test weight
		%[1]	%[2]	µmoles/g[3]	kg/hL[4]
Victoria					
Port Zone					
Geelong	CAN	45.4	37.0	9	66.13
Central Victoria					
Berrybank	CAN	45.4	36.8	7	67.25
Dunolly Sub	CAN	45.0	37.9	11	67.38
Elmore	CAN	44.4	39.0	14	66.75
Mitiamo	CAN	43.4	40.6	16	67.38
Murchison East	CAN	45.6	38.4	13	66.13
Tandarra	CAN	44.9	39.9	10	67.25
Westmere	CAN	46.0	36.5	9	67.38
Willaura	CAN	46.1	36.3	10	67.00
North east					
Barnes Crossing	CAN	44.3	40.7	10	68.00
Deniliquin	CAN	42.7	40.7	12	68.00
Dookie	CAN	45.3	38.1	13	66.13
Numurkah Sutcliffe	CAN	44.3	40.1	11	67.00
Oaklands	CAN	43.4	38.4	18	67.00
Tocumwal	CAN	43.2	39.7	12	68.00
Yarrawonga	CAN	43.9	37.7	14	66.63
Southern Mallee					
Beulah	CAN	43.0	40.5	13	67.25
Charlton	CAN	44.9	38.7	13	66.88
Donald	CAN	44.2	40.8	11	67.13
Rainbow	CAN	44.1	40.1	12	66.75
Warracknabeal	CAN	44.3	40.0	11	67.00
Wycheproof	CAN	43.5	40.0	9	66.75
Swan Hill					
Boort	CAN	44.9	38.6	11	66.75
Piangil	CAN	41.6	40.7	9	66.13
Quambatook	CAN	43.2	41.2	12	67.50
Wimmera					
Carpolac	CAN	44.7	38.0	10	67.50
Hamilton	CAN	45.5	36.9	10	66.75
Lillimur	CAN	44.9	38.7	10	67.50
Murtoa Sub	CAN	44.8	38.5	6	67.38
Naracoorte	CAN	44.5	37.0	9	66.50
Natimuk	CAN	45.4	36.6	8	67.25
Nhill	CAN	44.8	38.7	11	67.25
VIC weighted average		**44.7**	**38.3**	**11**	**67.01**
Vic minimum		**41.6**	**36.3**	**6**	**66.13**
Vic maximum		**46.1**	**41.2**	**18**	**68.00**

[1] % in whole seed @ 6% moisture
[2] % in oil-free meal @ 10% moisture
[3] µmoles/g in oil-free meal @ 10% moisture
[4] kilograms/ hectolitre.

Table 6. Quality data – Western Australia.

Port zone	Grade	Oil	Protein	Glucosinolates	Test weight
		%[1]	%[2]	µmoles/g[3]	kg/hL[4]
Albany	N/A	45.6	36.9	9	67.25
Esperance	N/A	44.8	37.3	12	67.50
Geraldton	N/A	44.3	38.3	10	66.50
Kwinana	N/A	45.1	39.1	7	67.63
WA weighted average		**45.1**	**37.8**	**9**	**67.32**
WA minimum		**44.3**	**36.9**	**7**	**66.50**
WA maximum		**45.6**	**39.1**	**12**	**67.63**

[1] % in whole seed @ 6% moisture
[2] % in oil-free meal @ 10% moisture
[3] µmoles/g in oil-free meal @ 10% moisture
[4] kilograms/ hectolitre.



Fatty acid composition by state

Table 7. Fatty acid composition – New South Wales.

Region/zone/site	14:0	16:0	16:1	17:0	17:1	18:0	18:1	18:2	18:3	20:0	20:1	22:0	22:1	24:0	24:1	Poly[1]	Mono[2]	Sat[3]	IV[4]
Northern NSW																			
Dubbo North																			
Gilgandra	0.07	4.2	0.3	0.2	0.2	2.1	62.1	18.5	9.9	0.6	1.2	0.3	<0.1	0.2	0.1	28.4	63.9	7.7	112.7
Dubbo West																			
Nevertire	0.06	4.4	0.3	0.1	0.1	2.0	60.1	20.8	9.7	0.6	1.1	0.3	<0.1	0.2	0.2	30.5	61.8	7.7	114.3
Trangie	0.07	4.4	0.3	0.1	0.1	2.0	61.0	20.7	9.0	0.6	1.1	0.3	<0.1	0.2	0.1	29.7	62.6	7.7	113.1
Trundle	0.07	4.5	0.3	0.1	0.1	1.9	61.0	21.5	8.3	0.6	1.0	0.3	<0.1	0.2	0.1	29.8	62.5	7.7	112.5
Moree North																			
Moree Sub	0.06	3.9	0.3	0.2	0.2	2.3	64.6	16.2	9.7	0.7	1.2	0.3	<0.1	0.2	0.1	25.9	66.4	7.7	110.4
Narrabri																			
Gunnedah	0.07	4.1	0.3	0.2	0.2	2.1	62.3	18.1	10.0	0.7	1.2	0.3	<0.1	0.2	0.2	28.1	64.2	7.7	112.5
Werris Creek																			
Willow Tree	0.07	4.1	0.3	0.2	0.2	2.2	63.2	17.6	9.5	0.7	1.2	0.3	<0.1	0.2	0.2	27.1	65.1	7.8	111.1
Premer	0.07	4.1	0.3	0.2	0.1	2.1	63.0	17.9	9.7	0.6	1.2	0.3	<0.1	0.2	0.2	27.6	64.8	7.6	111.9
Werris creek Sub	0.07	4.1	0.3	0.2	0.2	2.2	62.8	18.0	9.6	0.7	1.1	0.3	<0.1	0.2	0.2	27.6	64.6	7.8	111.6
Northern NSW weighted average	**0.07**	**4.2**	**0.3**	**0.2**	**0.2**	**2.1**	**62.2**	**18.8**	**9.6**	**0.6**	**1.2**	**0.3**	**<0.1**	**0.2**	**0.1**	**28.4**	**63.9**	**7.7**	**112.4**
Southern NSW																			
Boree Creek																			
Boree Creek	0.06	4.0	0.3	0.2	0.1	2.2	63.8	17.5	9.6	0.6	1.1	0.3	<0.1	0.1	0.1	27.1	65.4	7.5	111.5
Henty West	0.06	4.3	0.3	0.2	0.2	1.6	62.5	20.3	8.4	0.5	1.1	0.3	<0.1	0.1	0.1	28.7	64.2	7.1	112.2
Lockhart	0.06	4.2	0.3	0.2	0.1	1.8	62.4	18.4	10.1	0.6	1.1	0.3	<0.1	0.2	0.2	28.5	64.1	7.4	113.2
Milbrulong	0.06	4.1	0.3	0.2	0.1	1.8	62.1	18.5	10.4	0.6	1.1	0.3	<0.1	0.2	0.2	28.9	63.8	7.3	113.9
Cunningar																			
Cootamundra	0.05	4.2	0.3	0.2	0.2	1.6	62.0	20.4	8.9	0.5	1.1	0.3	<0.1	0.1	0.1	29.3	63.7	7.0	113.2
Cowra	0.05	4.1	0.3	0.2	0.2	1.7	62.3	19.6	9.3	0.6	1.1	0.3	<0.1	0.1	0.1	28.9	64.0	7.1	113.2
Cunningar	0.05	4.2	0.3	0.2	0.2	1.6	62.3	20.3	8.7	0.5	1.1	0.3	<0.1	0.1	0.1	29.0	64.0	7.0	112.8
Greenethorpe	0.06	4.3	0.3	0.1	0.1	1.8	61.0	19.9	10.2	0.6	1.0	0.3	<0.1	0.1	0.2	30.1	62.6	7.3	114.7
Maimuru	0.05	4.2	0.3	0.2	0.1	1.6	62.8	19.9	8.6	0.6	1.1	0.3	<0.1	0.1	0.1	28.5	64.4	7.1	112.2
Griffith																			
Barellan	0.07	4.4	0.3	0.1	0.1	1.8	60.7	20.5	9.5	0.6	1.2	0.3	<0.1	0.2	0.2	30.0	62.5	7.5	113.9
Goolgowi	0.07	4.3	0.3	0.2	0.1	1.9	61.6	18.9	10.1	0.6	1.2	0.3	<0.1	0.2	0.2	29.0	63.4	7.6	113.4
Junee																			
Coolamon	0.06	4.1	0.3	0.2	0.1	1.9	61.7	19.2	10.0	0.6	1.1	0.3	<0.1	0.2	0.2	29.2	63.4	7.4	113.7
Grong Grong	0.06	4.1	0.3	0.1	0.1	2.0	62.0	19.3	9.7	0.6	1.1	0.3	<0.1	0.2	0.1	29.0	63.6	7.4	113.3
Junee Sub	0.06	4.3	0.3	0.2	0.2	1.6	62.1	20.2	8.9	0.5	1.1	0.3	<0.1	0.1	0.1	29.1	63.8	7.1	113.0
Narrandera	0.07	4.3	0.3	0.2	0.1	2.0	61.8	19.2	9.6	0.6	1.1	0.3	<0.1	0.2	0.2	28.8	63.5	7.7	112.7
Parkes																			
Caragabal	0.07	4.4	0.3	0.2	0.1	1.9	61.1	20.0	9.5	0.6	1.1	0.3	<0.1	0.2	0.2	29.5	62.8	7.7	113.3
Parkes Sub	0.06	4.2	0.3	0.2	0.1	1.7	62.5	19.4	9.4	0.5	1.1	0.3	<0.1	0.1	0.1	28.8	64.1	7.1	113.2
Red Bend	0.06	4.2	0.3	0.2	0.1	2.0	62.0	19.3	9.4	0.6	1.1	0.3	<0.1	0.2	0.2	28.7	63.7	7.6	112.6
Temora																			
Ardlethan	0.06	4.2	0.3	0.1	0.1	1.9	62.6	19.0	9.3	0.6	1.1	0.3	<0.1	0.2	0.2	28.3	64.3	7.4	112.3
Bribbaree	0.06	4.1	0.3	0.2	0.1	2.0	62.7	18.2	10.0	0.6	1.1	0.3	<0.1	0.2	0.1	28.2	64.3	7.5	112.8
Milvale	0.06	4.1	0.3	0.1	0.1	1.9	62.8	18.4	9.9	0.6	1.1	0.3	<0.1	0.2	0.1	28.3	64.4	7.3	113.0
Quandialla	0.06	4.2	0.3	0.2	0.1	2.0	62.7	19.0	9.1	0.6	1.1	0.3	<0.1	0.2	0.1	28.1	64.3	7.6	111.9
Temora Sub	0.06	4.0	0.3	0.2	0.1	1.9	63.0	18.0	9.9	0.6	1.1	0.4	<0.1	0.2	0.2	27.9	64.7	7.4	112.5
Wyalong																			
Calleen	0.06	4.0	0.3	0.2	0.1	2.2	65.2	16.6	8.9	0.7	1.1	0.3	<0.1	0.2	0.1	25.5	66.8	7.7	109.3
Condobolin	0.06	4.2	0.3	0.1	0.1	2.0	64.5	19.2	7.1	0.6	1.1	0.3	<0.1	0.2	0.2	26.3	66.2	7.5	108.5
Wyalong	0.06	4.0	0.3	0.2	0.1	2.0	64.4	17.0	9.4	0.6	1.1	0.4	<0.1	0.2	0.2	26.4	66.1	7.5	110.6
Southern NSW weighted average	**0.06**	**4.2**	**0.3**	**0.2**	**0.1**	**1.8**	**62.5**	**19.3**	**9.2**	**0.6**	**1.1**	**0.3**	**<0.1**	**0.2**	**0.1**	**28.5**	**64.2**	**7.3**	**112.6**
NSW weighted average	**0.06**	**4.2**	**0.3**	**0.2**	**0.1**	**1.9**	**62.4**	**19.2**	**9.3**	**0.6**	**1.1**	**0.3**	**<0.1**	**0.2**	**0.1**	**28.5**	**64.1**	**7.4**	**112.5**
NSW minimum	**0.05**	**3.9**	**0.3**	**0.1**	**0.1**	**1.6**	**60.1**	**16.2**	**7.1**	**0.5**	**1.0**	**0.3**	**<0.1**	**0.1**	**0.1**	**25.5**	**61.8**	**7.0**	**108.5**
NSW maximum	**0.07**	**4.5**	**0.3**	**0.2**	**0.2**	**2.3**	**65.2**	**21.5**	**10.4**	**0.7**	**1.2**	**0.4**	**<0.1**	**0.2**	**0.2**	**30.5**	**66.8**	**7.8**	**114.7**

[1] Poly – sum of polyunsaturated fatty acids (18:2 and 18:3).
[2] Mono – sum of monounsaturated fatty acids (16:1, 17:1, 18:1, 20:1, 22:1 and 24:1).
[3] Sat – sum of saturated fatty acids (14:0, 16:0, 17:0, 18:0, 20:0, 22:0 and 24:0).
[4] IV – iodine value calculated from fatty acid composition.

Table 8. Fatty acid composition – South Australia.

Region/zone/site	14:0	16:0	16:1	17:0	17:1	18:0	18:1	18:2	18:3	20:0	20:1	22:0	22:1	24:0	24:1	Poly[1]	Mono[2]	Sat[3]	IV[4]
Adelaide																			
Port Adelaide	0.06	4.2	0.3	0.2	0.1	1.8	60.0	19.8	11.2	0.6	1.1	0.3	<0.1	0.1	0.2	31.0	61.7	7.3	116.4
Adelaide weighted average	**0.06**	**4.2**	**0.3**	**0.2**	**0.1**	**1.8**	**60.0**	**19.8**	**11.2**	**0.6**	**1.1**	**0.3**	**<0.1**	**0.1**	**0.2**	**31.0**	**61.7**	**7.3**	**116.4**
Central																			
Bowmans	0.06	4.0	0.3	0.2	0.2	1.9	61.8	17.9	11.2	0.6	1.1	0.3	<0.1	0.2	0.2	29.1	63.6	7.3	114.8
Gladstone	0.06	4.2	0.3	0.1	0.1	1.8	61.4	19.1	10.7	0.5	1.1	0.3	<0.1	0.1	0.2	29.8	63.1	7.1	115.1
Port Giles	0.05	3.9	0.3	0.2	0.2	1.9	62.1	17.6	11.3	0.6	1.1	0.3	<0.1	0.2	0.2	28.9	63.9	7.2	114.8
Roseworthy	0.06	4.2	0.3	0.2	0.2	1.8	61.2	19.0	10.7	0.6	1.1	0.3	<0.1	0.1	0.2	29.7	63.0	7.3	114.8
Central weighted average	**0.06**	**4.1**	**0.3**	**0.2**	**0.2**	**1.8**	**61.6**	**18.4**	**11.0**	**0.6**	**1.1**	**0.3**	**<0.1**	**0.1**	**0.2**	**29.4**	**63.4**	**7.2**	**114.9**
Eastern																			
Bordertown	0.06	4.4	0.3	0.1	0.1	1.7	59.3	20.7	11.1	0.5	1.1	0.3	<0.1	0.1	0.2	31.8	61.0	7.2	117.1
Dooen	0.06	4.2	0.3	0.2	0.1	1.9	61.9	18.4	10.5	0.6	1.1	0.3	<0.1	0.2	0.2	28.9	63.6	7.5	113.8
Edillilie	0.06	4.2	0.3	0.2	0.2	1.9	62.0	17.8	11.0	0.6	1.1	0.3	<0.1	0.1	0.2	28.8	63.8	7.4	114.2
Frances	0.06	4.5	0.3	0.2	0.1	1.9	60.2	20.2	10.4	0.5	1.0	0.3	<0.1	0.1	0.2	30.6	61.8	7.6	115.1
Keith	0.06	4.1	0.3	0.2	0.2	1.9	62.0	17.8	11.0	0.6	1.1	0.3	<0.1	0.2	0.2	28.8	63.8	7.4	114.2
Tailem Bend	0.06	4.1	0.3	0.2	0.1	1.8	61.2	18.5	11.4	0.6	1.1	0.3	<0.1	0.1	0.2	29.9	62.9	7.2	115.7
Wolseley	0.06	4.2	0.3	0.2	0.2	1.9	61.6	18.0	11.1	0.6	1.1	0.3	<0.1	0.2	0.2	29.1	63.4	7.5	114.5
Eastern weighted average	**0.06**	**4.1**	**0.3**	**0.2**	**0.1**	**1.8**	**61.4**	**18.4**	**11.2**	**0.6**	**1.1**	**0.3**	**<0.1**	**0.1**	**0.2**	**29.6**	**63.1**	**7.3**	**115.1**
Western																			
Cummins	0.06	4.1	0.3	0.2	0.2	2.0	62.4	17.5	10.8	0.6	1.1	0.3	<0.1	0.2	0.2	28.3	64.2	7.5	113.5
Port Lincoln	0.06	4.0	0.3	0.2	0.2	2.0	63.0	16.9	10.9	0.6	1.1	0.3	<0.1	0.2	0.2	27.8	64.8	7.4	113.3
Rudall	0.06	4.2	0.3	0.1	0.1	1.9	59.8	20.4	10.8	0.6	1.1	0.3	<0.1	0.1	0.2	31.2	61.5	7.3	116.2
Tumby Bay	0.06	4.0	0.3	0.2	0.2	2.1	62.5	16.9	11.3	0.6	1.1	0.3	<0.1	0.2	0.2	28.2	64.3	7.5	113.9
Western weighted average	**0.06**	**4.1**	**0.3**	**0.2**	**0.2**	**2.0**	**62.5**	**17.4**	**10.9**	**0.6**	**1.1**	**0.3**	**<0.1**	**0.2**	**0.2**	**28.2**	**64.3**	**7.4**	**113.6**
SA weighted average	**0.06**	**4.1**	**0.3**	**0.2**	**0.2**	**1.9**	**61.8**	**18.1**	**11.0**	**0.6**	**1.1**	**0.3**	**<0.1**	**0.2**	**0.2**	**29.1**	**63.6**	**7.3**	**114.5**
SA minimum	**0.05**	**3.9**	**0.3**	**0.1**	**0.1**	**1.7**	**59.3**	**16.9**	**10.4**	**0.5**	**1.0**	**0.3**	**<0.1**	**0.1**	**0.2**	**27.8**	**61.0**	**7.1**	**113.3**
SA maximum	**0.06**	**4.5**	**0.3**	**0.2**	**0.2**	**2.1**	**63.0**	**20.7**	**11.4**	**0.6**	**1.1**	**0.3**	**<0.1**	**0.2**	**0.2**	**31.8**	**64.8**	**7.6**	**117.1**

[1] Poly – sum of polyunsaturated fatty acids (18:2 and 18:3).
[2] Mono – sum of monounsaturated fatty acids (16:1, 17:1, 18:1, 20:1, 22:1 and 24:1).
[3] Sat – sum of saturated fatty acids (14:0, 16:0, 17:0, 18:0, 20:0, 22:0 and 24:0).
[4] IV – iodine value calculated from fatty acid composition.

Table 9. Fatty acid composition – Victoria.

Region/zone/site	14:0	16:0	16:1	17:0	17:1	18:0	18:1	18:2	18:3	20:0	20:1	22:0	22:1	24:0	24:1	Poly[1]	Mono[2]	Sat[3]	IV[4]
Port Zone																			
Geelong	0.05	4.3	0.3	0.1	0.1	1.7	60.0	19.9	11.2	0.6	1.1	0.3	<0.1	0.1	0.2	31.1	61.7	7.2	116.6
Central Victoria																			
Berrybank	0.05	4.2	0.3	0.1	0.1	1.7	59.5	20.3	11.2	0.6	1.1	0.4	<0.1	0.2	0.2	31.5	61.2	7.3	116.8
Dunolly Sub	0.06	4.2	0.3	0.1	0.1	1.8	61.3	19.7	10.1	0.6	1.1	0.3	<0.1	0.1	0.2	29.8	63.0	7.2	114.5
Elmore	0.06	4.3	0.3	0.1	0.1	1.7	60.0	21.0	10.2	0.5	1.1	0.3	<0.1	0.1	0.2	31.2	61.7	7.1	115.9
Mitiamo	0.06	4.2	0.3	0.1	0.1	1.8	60.2	20.6	10.3	0.6	1.1	0.3	<0.1	0.1	0.2	30.9	61.9	7.2	115.6
Murchison East	0.06	4.1	0.3	0.1	0.1	1.7	60.2	20.5	10.7	0.5	1.1	0.3	<0.1	0.1	0.2	31.2	61.9	6.9	116.5
Tandarra	0.06	4.1	0.3	0.1	0.1	1.9	66.7	19.7	4.6	0.6	1.1	0.3	<0.1	0.2	0.2	24.3	68.4	7.3	104.7
Westmere	0.05	4.3	0.3	0.1	0.1	1.9	60.4	20.4	10.1	0.6	1.1	0.3	<0.1	0.1	0.2	30.5	62.1	7.4	114.9
Willaura	0.06	4.4	0.3	0.1	0.1	1.8	59.6	20.8	10.5	0.6	1.1	0.3	<0.1	0.1	0.2	31.3	61.3	7.4	116.0
North east																			
Barnes Crossing	0.05	4.0	0.3	0.1	0.1	1.8	62.0	19.1	10.0	0.6	1.2	0.3	0.1	0.1	0.2	29.1	63.9	7.0	113.9
Deniliquin	0.06	4.1	0.3	0.1	0.1	1.8	61.5	19.5	10.1	0.6	1.1	0.3	<0.1	0.2	0.2	29.6	63.2	7.2	114.3
Dookie	0.06	4.2	0.3	0.1	0.1	1.7	60.5	20.3	10.5	0.5	1.1	0.3	<0.1	0.1	0.2	30.8	62.2	7.0	115.9
Numurkah Sutcliffe	0.06	4.2	0.3	0.1	0.1	1.8	61.7	20.6	8.8	0.6	1.1	0.3	<0.1	0.1	0.2	29.4	63.4	7.2	113.0
Oaklands	0.06	4.1	0.3	0.1	0.1	1.7	61.2	20.2	9.9	0.6	1.1	0.3	<0.1	0.1	0.2	30.1	62.9	7.0	114.7
Tocumwal	0.06	4.3	0.3	0.1	0.1	1.7	60.0	21.1	10.0	0.6	1.1	0.3	<0.1	0.1	0.2	31.1	61.7	7.2	115.5
Yarrawonga	0.06	4.2	0.3	0.1	0.1	1.7	60.3	21.1	9.9	0.5	1.1	0.3	<0.1	0.1	0.2	31.0	62.0	7.0	115.5
Southern Mallee																			
Beulah	0.06	4.2	0.3	0.2	0.1	1.8	60.4	19.8	10.7	0.6	1.1	0.3	<0.1	0.2	0.2	30.5	62.1	7.4	115.4
Charlton	0.06	4.1	0.3	0.2	0.1	1.8	63.0	18.1	9.8	0.6	1.2	0.3	<0.1	0.2	0.2	27.9	64.8	7.3	112.5
Donald	0.06	4.0	0.3	0.2	0.1	1.9	62.7	18.0	10.5	0.6	1.1	0.3	<0.1	0.1	0.1	28.5	64.3	7.2	113.8
Rainbow	0.06	4.2	0.3	0.2	0.1	1.8	60.7	19.7	10.9	0.5	1.0	0.3	<0.1	0.1	0.1	30.6	62.2	7.2	116.0
Warracknabeal	0.06	4.1	0.3	0.2	0.1	1.8	60.9	19.2	11.0	0.6	1.1	0.3	<0.1	0.1	0.2	30.2	62.6	7.2	115.6
Wycheproof	0.06	4.0	0.3	0.2	0.2	1.9	62.2	18.0	10.7	0.6	1.1	0.3	<0.1	0.2	0.2	28.7	64.0	7.3	114.0
Swan Hill																			
Boort	0.06	4.1	0.3	0.1	0.1	1.9	62.4	18.7	10.1	0.6	1.1	0.3	<0.1	0.1	0.1	28.8	64.0	7.2	113.7
Piangil	0.07	4.1	0.3	0.2	0.1	1.9	62.2	17.8	10.8	0.6	1.1	0.4	<0.1	0.2	0.2	28.6	63.9	7.5	113.8
Quambatook	0.06	4.2	0.3	0.1	0.1	1.8	61.6	19.4	10.2	0.6	1.1	0.3	<0.1	0.1	0.1	29.6	63.2	7.2	114.5
Wimmera																			
Carpolac	0.06	4.2	0.3	0.2	0.1	1.8	61.2	18.8	11.0	0.6	1.1	0.3	<0.1	0.1	0.2	29.8	62.9	7.3	115.2
Hamilton	0.06	4.3	0.3	0.2	0.1	1.9	61.2	19.2	10.4	0.6	1.1	0.3	<0.1	0.1	0.2	29.6	62.9	7.5	114.3
Lillimur	0.06	4.1	0.3	0.2	0.2	1.9	61.7	18.1	11.0	0.6	1.1	0.3	<0.1	0.2	0.2	29.1	63.5	7.4	114.5
Murtoa Sub	0.06	4.2	0.3	0.2	0.1	1.9	62.1	18.2	10.5	0.6	1.1	0.3	<0.1	0.2	0.2	28.7	63.8	7.5	113.6
Naracoorte	0.06	4.3	0.3	0.2	0.1	1.9	61.0	19.1	10.7	0.6	1.1	0.3	<0.1	0.1	0.2	29.8	62.7	7.5	114.7
Natimuk	0.06	4.3	0.3	0.1	0.1	1.8	61.0	19.8	10.2	0.6	1.1	0.3	<0.1	0.1	0.2	30.0	62.7	7.3	114.7
Nhill	0.06	4.1	0.3	0.2	0.1	1.9	62.0	18.2	10.7	0.6	1.1	0.3	<0.1	0.2	0.2	28.9	63.7	7.4	114.0
Victorian weighted average	**0.06**	**4.2**	**0.3**	**0.1**	**0.1**	**1.8**	**60.9**	**19.8**	**10.4**	**0.6**	**1.1**	**0.3**	**<0.1**	**0.1**	**0.2**	**30.2**	**62.6**	**7.2**	**115.0**
Vic minimum	**0.05**	**4.0**	**0.3**	**0.1**	**0.1**	**1.7**	**59.5**	**17.8**	**4.6**	**0.6**	**1.0**	**0.3**	**<0.1**	**0.1**	**0.1**	**24.3**	**61.2**	**6.9**	**104.7**
Vic maximum	**0.07**	**4.4**	**0.3**	**0.2**	**0.2**	**1.9**	**66.7**	**21.1**	**11.2**	**0.6**	**1.2**	**0.4**	**0.1**	**0.2**	**0.2**	**31.5**	**68.4**	**7.5**	**116.8**

[1] Poly – sum of polyunsaturated fatty acids (18:2 and 18:3).
[2] Mono – sum of monounsaturated fatty acids (16:1, 17:1, 18:1, 20:1, 22:1 and 24:1).
[3] Sat – sum of saturated fatty acids (14:0, 16:0, 17:0, 18:0, 20:0, 22:0 and 24:0).
[4] IV – iodine value calculated from fatty acid composition.

Table 10. Fatty acid composition – Western Australia.

Region/zone/site	14:0	16:0	16:1	17:0	17:1	18:0	18:1	18:2	18:3	20:0	20:1	22:0	22:1	24:0	24:1	Poly[1]	Mono[2]	Sat[3]	IV[4]
Albany	0.06	4.3	0.3	0.1	0.1	1.8	60.6	19.9	10.5	0.6	1.1	0.3	<0.1	0.1	0.2	30.4	62.3	7.3	115.3
Esperance	0.06	4.4	0.3	0.1	0.1	1.7	58.4	21.6	11.1	0.5	1.1	0.3	<0.1	0.1	0.2	32.7	60.1	7.2	117.9
Geraldton	0.06	4.3	0.3	0.1	0.1	1.9	61.6	20.2	9.4	0.5	1.0	0.3	<0.1	0.1	0.1	29.6	63.1	7.3	113.7
Kwinana	0.06	4.2	0.3	0.1	0.1	2.0	61.3	20.0	9.7	0.6	1.1	0.3	<0.1	0.1	0.1	29.7	62.9	7.4	113.9
WA weighted average	**0.06**	**4.3**	**0.3**	**0.1**	**0.1**	**1.8**	**60.4**	**20.4**	**10.3**	**0.6**	**1.1**	**0.3**	**<0.1**	**0.1**	**0.2**	**30.6**	**62.1**	**7.3**	**115.3**
WA Minimum	**0.06**	**4.2**	**0.3**	**0.1**	**0.1**	**1.7**	**58.4**	**19.9**	**9.4**	**0.5**	**1.0**	**0.3**	**<0.1**	**0.1**	**0.1**	**29.6**	**60.1**	**7.2**	**113.7**
WA Maximum	**0.06**	**4.4**	**0.3**	**0.1**	**0.1**	**2.0**	**61.6**	**21.6**	**11.1**	**0.6**	**1.1**	**0.3**	**<0.1**	**0.1**	**0.2**	**32.7**	**63.1**	**7.4**	**117.9**

[1] Poly – sum of polyunsaturated fatty acids (18:2 and 18:3).
[2] Mono – sum of monounsaturated fatty acids (16:1, 17:1, 18:1, 20:1, 22:1 and 24:1).
[3] Sat – sum of saturated fatty acids (14:0, 16:0, 17:0, 18:0, 20:0, 22:0 and 24:0).
[4] IV – iodine value calculated from fatty acid composition.

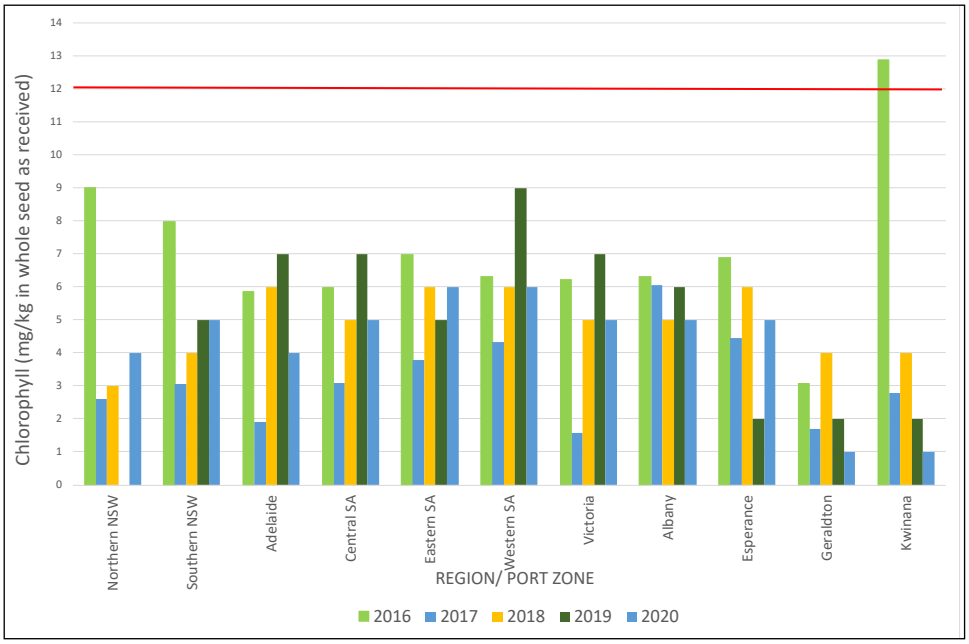
Chlorophyll

The average chlorophyll content for the Australian harvest in 2020 was 4 mg/kg (4 ppm) in whole seed as received. This was a decrease of 1 mg/kg (1ppm) from the 2019 harvest of 5 mg/kg (5 ppm).

Table 11. Chlorophyll by region/ port zone.

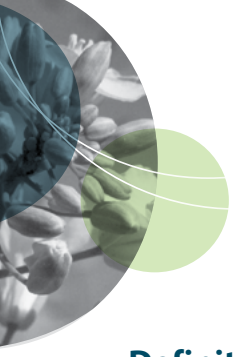
State	Region/port zone	Chlorophyll (mg/kg)[1]
NSW	Northern	4
NSW	Southern	5
SA	Adelaide	4
SA	Central	5
SA	Eastern	6
SA	Western	6
Vic	Victoria	5
WA	Albany	5
WA	Esperance	5
WA	Geraldton	1
WA	Kwinana	1
Australian weighted average		**4**

[1] mg/kg in whole seed as received



Red line indicates the AOF limit of 12 mg/kg in whole seed

Figure 28. Average chlorophyll content by region/ port zone 2016–2020.



Definitions, methods and references

Definitions

Canola

Canola is defined as seed of the species *Brassica napus* or *Brassica rapa*, but containing less than 30 micromoles of specified glucosinolates per gram of oil-free, air-dry solids and not more than 2% erucic acid of total fatty acids in the oil component. The specified glucosinolates are any one or a mixture of 3-butenyl, 4-pentenyl, 2-hydroxy-3-butenyl and 2-hydroxy-4-pentenyl glucosinolates (Australian Oilseeds Federation (AOF) 2020, page 31)).

Canola is traded under the grade 'CAN' by GrainCorp Operations Limited and 'CANO' by Viterra Pty Ltd.

The AOF *Section 1: Quality Standards, Technical Information & Typical Analysis (2020–21)* Standard Reference for canola is CSO 1, Standard Reference for non-GM canola is CSO 1-a.

GM canola

Genetically modified (GM) canolas are lines approved for commercial release in Australia by the Office of the Gene Technology Regulator (OGTR).

Methods

Moisture content

Moisture is determined on whole seed using a Bruker MPA II spectrometer (NIRs) calibrated from results obtained using the International Standards Organisation (ISO) 665 – 'Oilseeds – determination of moisture and volatile matter content' method. The moisture contents are used to convert the raw data for oil, protein and glucosinolates to the appropriate moisture content for reporting.

Oil content

Oil content is determined by Bruker MPA II NIRs, calibrated from results obtained using ISO 659 'Oilseeds – determination of oil content (reference method)' method. Oil is extracted from ground seed on either a Foss Soxtec™ 2050 or 8000 extraction system using hexane for four hours. The sample is reground and extracted for two hours. The sample is again ground and extracted for a further two hours. The results are reported as a percentage of the whole seed at 6% moisture.

Protein content

Protein content is determined on whole seed by Bruker MPA II NIRs, calibrated from samples analysed by the LECO elemental analyser using AOF 4-3.3 'Protein, crude, of meals (combustion)' method. Results are reported as percent protein (nitrogen × 6.25) in oil-free meal at 10% moisture.

Glucosinolate content

Total glucosinolate content is determined by Bruker MPA II NIRs, calibrated by obtaining results using 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 high performance liquid chromatography methodology of the American Oil Chemists' Society (AOCS) with the added advantage of speed and economy. Results are reported as µmoles glucosinolates/gram in oil-free meal at 10% moisture.

Fatty acid composition

Fatty acid composition involves methylation of fatty acids with a methanolic solution of potassium hydroxide. The method is based on International Olive Council, COI/T.20/Doc. No. 33 'Determination of fatty acid methyl esters by gas chromatography'. 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 in the oil portion of the seed.

Iodine values

Iodine values are calculated from the fatty acid profile using AOCS Cd 1c-85 'Calculated iodine value'.

Test weight

Test weight is a volumetric grain weight measured using a Franklin chrondrometer and reported as kilograms/hectolitre.

Chlorophyll content

Chlorophyll content is determined using AOCS method Ak 2-92 'Determination of chlorophyll content in rapeseed/canola'. Ground canola seed is placed in a mechanical microgrinder with solvent for one hour. The sample is then filtered and the solutions's absorbance is determined on a UV-Vis spectrophotometer at 625 nm, 665 nm and 705 nm. Results are reported as mg/kg in whole seed as received.

References

Australian Oilseeds Federation *Section 1: Quality Standards, Technical Information & Typical Analysis 2020/21* Issue 19, 1 August 2020.