

Quality of Australian canola 2021–22



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Cover

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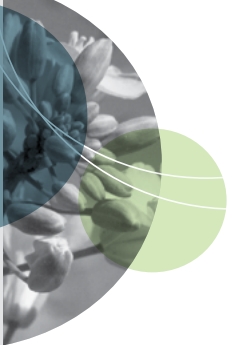
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Introduction

Sample analysis

Canola samples representing the 2021 harvest were received from GrainCorp Operations Limited (Queensland, New South Wales and Victoria), Viterro 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 Queensland, New South Wales, Victoria and South Australia. Samples representing each of the 4 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. This year, GrainCorp Operations Limited submitted 2 samples from the Goondiwindi zone in Queensland. These 2 samples from southern Queensland have been incorporated into the northern New South Wales data.

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

Each sample was analysed for oil, protein and glucosinolate content; fatty acid composition 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 Viterro's Adelaide, Central, Eastern and Western regions in South Australia. Western Australia's 4 port zone samples were analysed as received from CBH. 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 – $\mu\text{moles/g}$, oil-free meal at 10% moisture

Test Weight – kg/hL, on clean seed

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

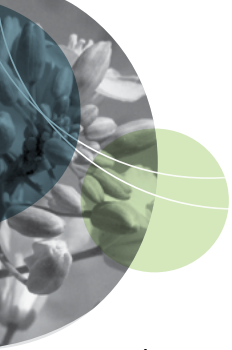
Saturated fatty acids content – % of total fatty acids

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

Definitions, methods and references on page 28 are at the end of this book.



Sustainability of Australian canola

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

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 20.2 million tonnes of canola has been supplied to the EU as certified sustainable worth A\$12.2 billion (Figure 1).

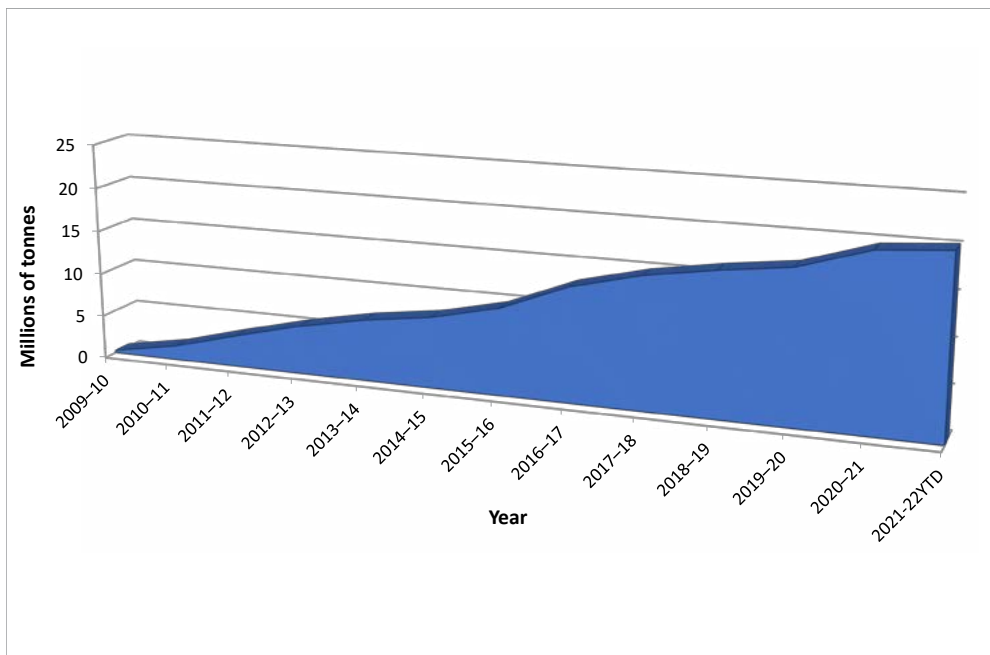


Figure 1. Certified sustainable canola exports to the EU (cumulative).

The success of Australian farmers who can supply certified sustainable canola has driven confidence within other markets to source high and consistent quality, certified sustainable Australian canola. From the 2021 harvest, over 3.0 million tonnes, representing just under half the crop, was traded as certified sustainable into the food and feed markets, in addition to 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 use oil and meal from certified sustainable Australian canola in order to help them meet their corporate sustainability sourcing commitments.



Weather and production review

Seasonal conditions overall were excellent to near ideal for canola production in 2021. Fallow rainfall for the 3 months before April sowing was above average to well above average (decile 8–10) across the cropping zones of New South Wales, central and north-eastern Victoria and Western Australia (Figure 2). Rainfall in the Mallee region of Victoria, and most of South Australia, was average to below average (decile 2–6).

Rainfall for the crop establishment and vegetative growth period of 1 April to 30 June was average (decile 4–7) across most of New South Wales and parts of Victoria, but the Mallee of Victoria and South Australia was much drier at decile 1–3 (Figure 3). Other areas of South Australia received average to below average rainfall while Western Australia received average to above average rainfall across most regions.

Most regions of all states received average to above average rainfall (decile 5–9) for the second half of the growing season (Figure 4). A feature of the 2021 season were the mild temperatures. Mild spring temperatures, without any significant heat stress that commonly occurs, extended the flowering and pod set period, as well as seed and pod filling that combined to produce record yields and record high oil contents.

New South Wales

An estimated 700,000 ha of canola was sown in 2021, an increase of about 40% on the area sown in 2020. Late summer and early autumn rainfall were above average to well above average, providing good, stored subsoil moisture, but less than in 2020. Conditions turned very dry through April with patchy establishment in early-sown crops. Dry sowing progressed through late April and was followed by rainfall in early May in the centre and north of the state, with lighter and more patchy falls in the south.

Unseasonable frosts were recorded in early May across the central west and northern Riverina, damaging seedlings establishing in stubble retention systems, but these later recovered. Conditions turned wet in June which interrupted weed control and topdressing operations across the centre and south. Average to above rainfall for July, September and October was in contrast to August, which was relatively dry. November turned extremely wet and vast areas of the state recorded the highest November rainfall on record that led to a delayed, wet harvest in the centre and south, and causing significant weather damage to grain.

Growers generally applied more nitrogen to crops compared with 2020 in response to good seasonal conditions and rising canola prices. Most crops in central and southern districts were treated to control sclerotinia stem rot and upper canopy blackleg – it was viewed as cheap insurance as grain prices continued to rise. In the mild spring conditions, few crops were treated for pests, except for some aphids in western areas.

Across the entire state seed oil contents were the highest on record and reflected the crop nutrition, mild growing conditions through spring, and adequate soil moisture available to finish crops.

Final estimated production for NSW was 1.64 million tonnes from an estimated 700,000 ha for an average yield of 2.34 t/ha.

Victoria

The Victorian crop area rose 11% to an estimated 500,000 ha in 2021. Similar to New South Wales, it was very dry in April and only those crops sown in very early April established well. Dry sowing gained momentum from the middle of the month.

Opening rains for sowing were patchy in May, with some areas getting enough rain at the end of the first week while other areas had to wait until the end of the month.

Rainfall improved in June and July with both months finishing with average to above average rainfall across the cropping zone. Rainfall and temperatures followed a similar pattern to New South Wales from August onwards except November rainfall was average to above average, well below what fell in southern

NSW. Crop management (nitrogen nutrition and fungicide use) was similar to New South Wales, and tailored to the seasonal conditions, crop prices and yield potential. Spring pest pressure was low due to the mild temperatures.

The final estimated production for Victoria was 1.14 million tonnes from an estimated 500,000 ha for an average yield of 2.29 t/ha.

South Australia

The area sown to canola in South Australia has the least yearly variance of all canola producing states. The area sown in 2021 increased slightly over 2020, estimated at 230,000 ha. Following a dry April, May also recorded below average rainfall. Establishment was patchy following light and sporadic rain in early May.

Rainfall through June and July was generally above average across most areas, setting up the crop for good yield potential. In August, rainfall was average to above average, but September was dry. October rainfall was average to below average, but crops had stored soil moisture reserves to draw on following good winter rains. The dry September/October reduced disease pressure late in the season. Insect pressure was low, and in line with other eastern states.

The final estimated production for South Australia was 418,000 t from an estimated 230,000 ha for an average yield of 1.82 t/ha.

Western Australia

The area sown to canola increased 39% to 1,540,000 ha in 2021. The Western Australia cropping zone received above average to well above average rainfall in February and March in the leadup to the main sowing month of April, which also received average to above average rainfall. It was one of the best starts for a number of years and set the crop on the path to a high yield potential.

Rainfall in May was above average and in June only the Albany and Esperance zones received above average rainfall causing waterlogging damage to many crops. The rest of the state generally recorded below average to well below average rainfall. Rainfall alternated month by month for the rest of the season: below average in July, above average for August, dry again in September and finishing with average to well above average rainfall for October. A widespread frost in the Kwinana north east was thought to have badly damaged canola crops, but most of the damage was in the wheat crop.

The amount of sclerotinia stem rot increased in 2021, where seasonal conditions suited the pathogen causing the disease. Also observed was increased sclerotinia in lupins, a rotation crop with canola. Fungicide use for sclerotinia was high in crops grown closer to the coast. Pest pressure was low overall, but there was a concerning level of mouse build up, serving as a warning for the 2022 crop.

The final estimated production for Western Australia was 3.13 million tonnes from an estimated 1.54 million hectares for an average yield of 2.03 t/ha.

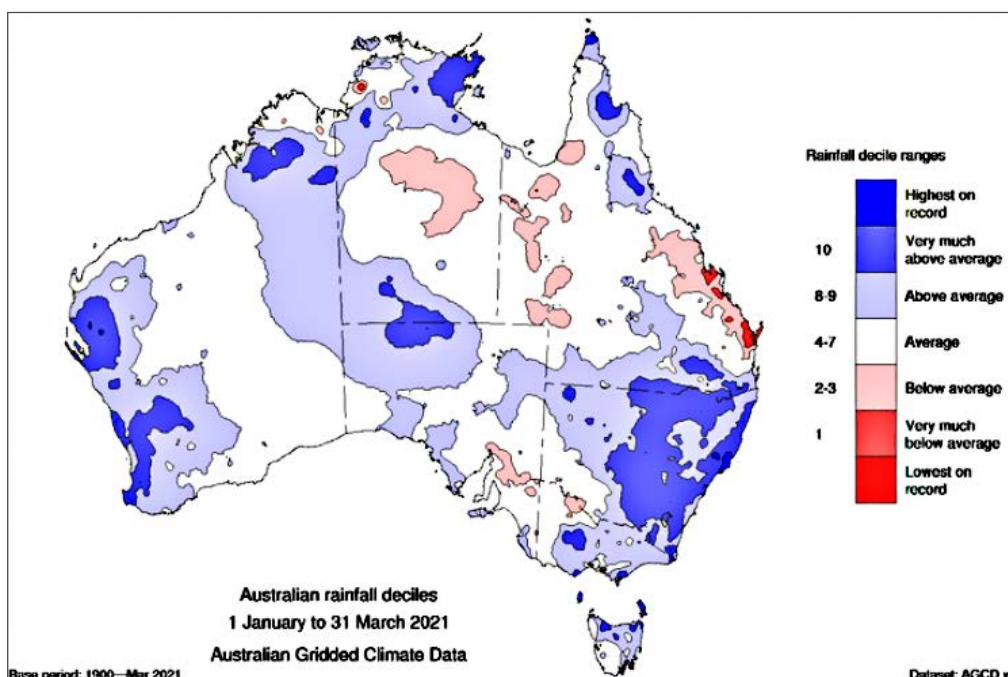


Figure 2. Australian rainfall deciles 1 January to 31 March 2021. (Source: Bureau of Meteorology)

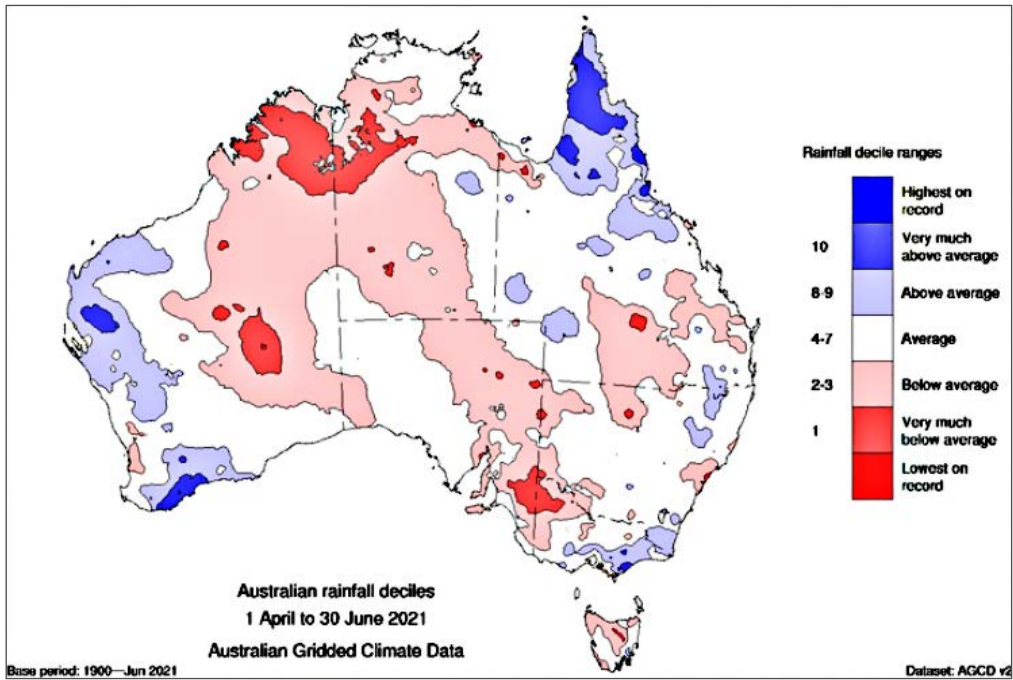


Figure 3. Australian rainfall deciles 1 April to 30 June 2021. (Source: Bureau of Meteorology)

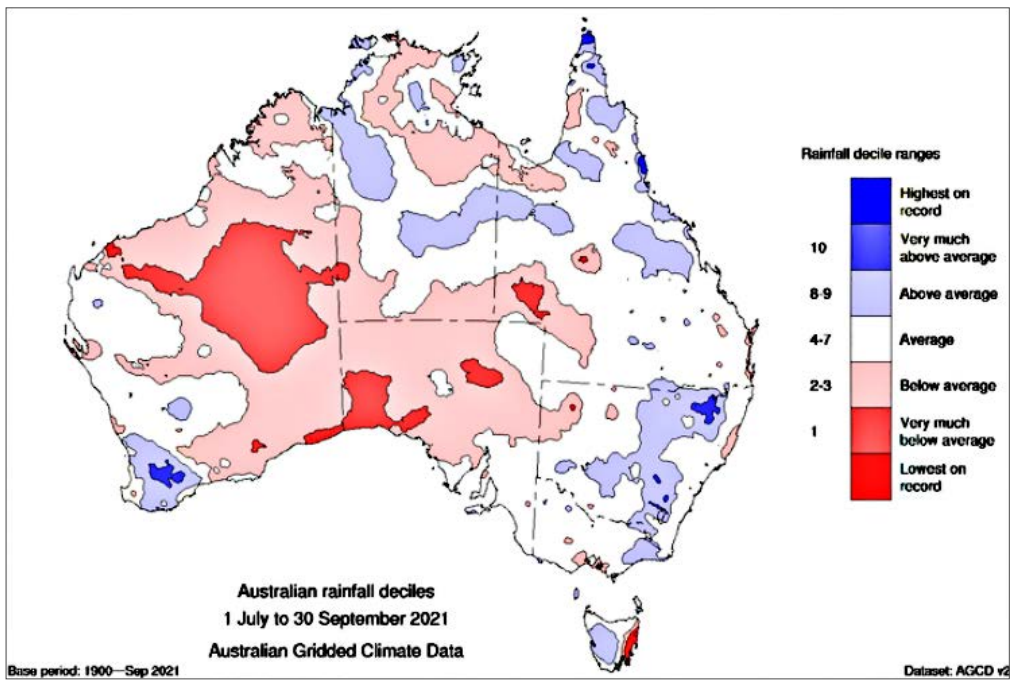
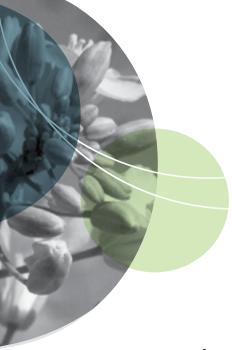


Figure 4. Australian rainfall deciles 1 July to 30 September 2021. (Source: Bureau of Meteorology)

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



Yield

Australia produced an estimated record 6.33 million tonnes of canola in 2021 from an estimated harvested area of 2.97 million hectares for an average yield of 2.13 t/ha. State yields ranged from 1.82 t/ha in South Australia to 2.34 t/ha in New South Wales.

The national crop area increased by 30% on 2020, while production rose 48% due to well above average yields across all states. Production nationally was the highest on record as was yield per hectare. Area sown, and production, in each state is shown in Table 1 and Figure 5.

Table 1. Estimated Australian canola production by state in 2021.

State	Area sown (hectares)	Production (tonnes)	Average yield (tonnes/hectare)
New South Wales	700,000	1,637,000	2.34
South Australia	230,000	418,000	1.82
Victoria	500,000	1,144,000	2.29
Western Australia	1,540,000	3,130,000	2.03
Australia	2,970,000	6,329,000	2.13

Source: (Source: ABARES Crop Report February 2022; GIWA Crop Report February 2022; Lachstock Consulting; AOF estimates)

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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/>)

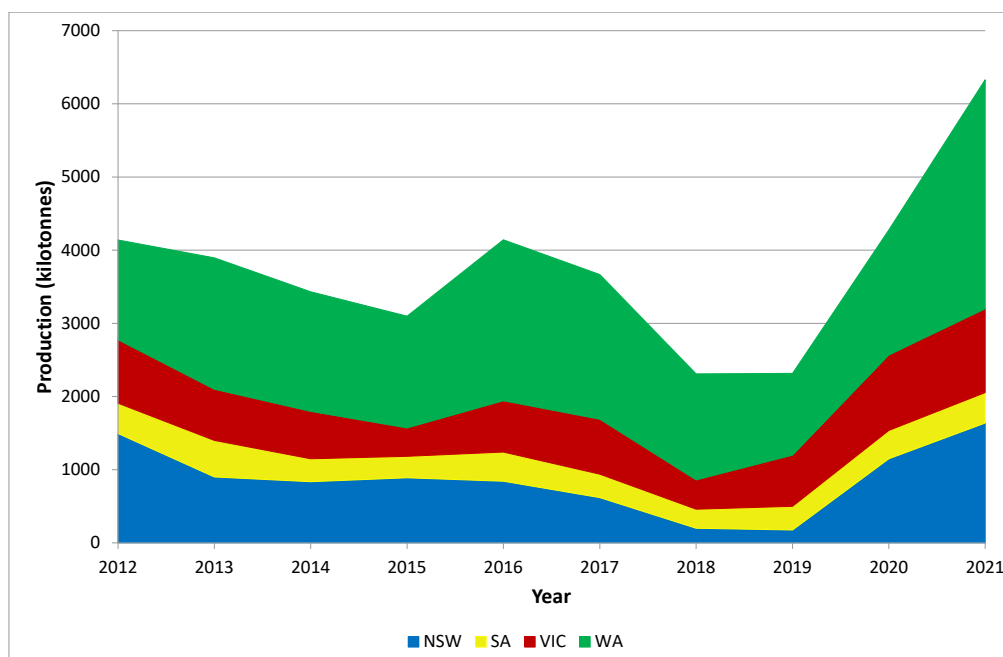


Figure 5. Canola production in Australia 2012–2021.



Australian quality parameter summary

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

The Australian national weighted average was calculated using the production figures for each state (Table 2).

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

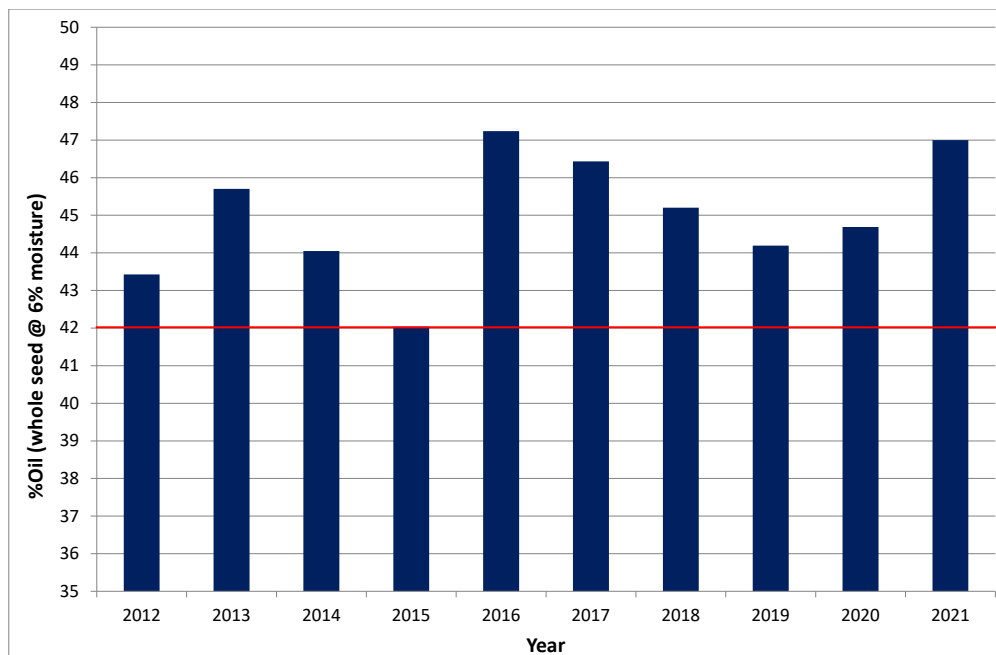
Table 2. Average quality of Australian canola 2021.

Quality parameter	Australian weighted average
Oil content, % in whole seed @ 6% moisture	47.0
Protein content, % in oil-free meal @ 10% moisture	37.7
Glucosinolates, μ moles/g in oil-free meal @ 10% moisture	14
Test weight, kg/hL	66.2
Oleic acid (C18:1), % ¹	59.9
Linoleic acid (C18:2), % ¹	20.4
Linolenic acid (C18:3), % ¹	10.7
Erucic acid (C22:1), % ¹	<0.1
Saturated fatty acids, % ¹	7.3
Monounsaturated fatty acids, % ¹	61.5
Polyunsaturated fatty acids, % ¹	31.2
Iodine value	116.1
Chlorophyll content, mg/kg in whole seed as received	5

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

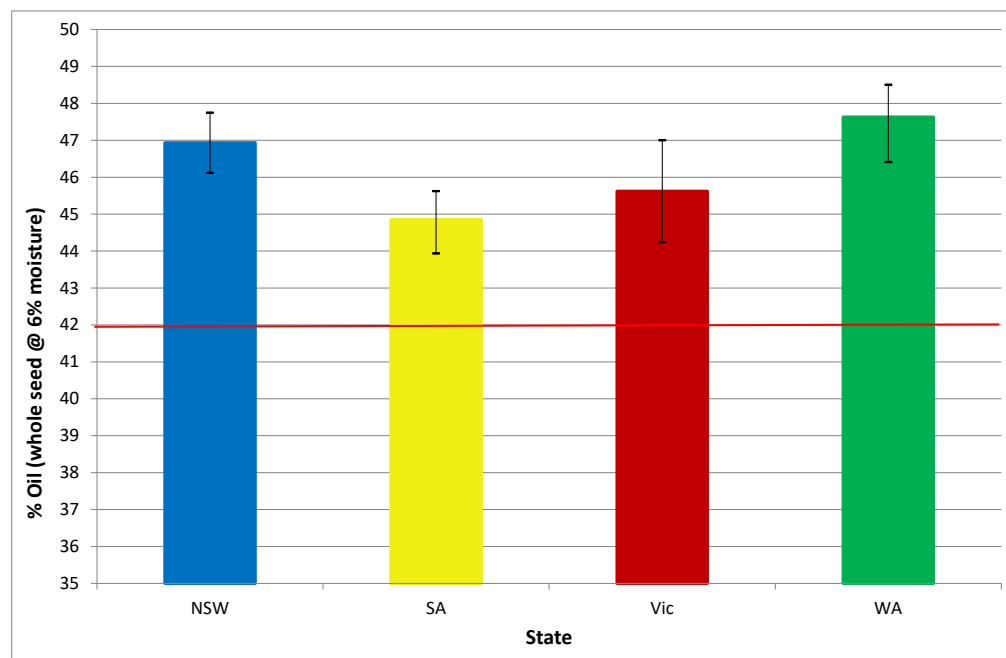
Oil content

The average oil content for the Australian harvest in 2021 was 47.0%. This was 2.3 percentage points higher than the 2020 harvest of 44.7%. The receival site oil content ranged from 41.9% at Beulah in Victoria to 49.3% at Trundle in New South Wales. The port zone oil content ranged from 46.2% at Geraldton in Western Australia to 48.8% at Albany in Western Australia. Oil content has been reported as the percentage in whole seed @ 6% moisture (figures 6 and 7).



The 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 2012–2021.

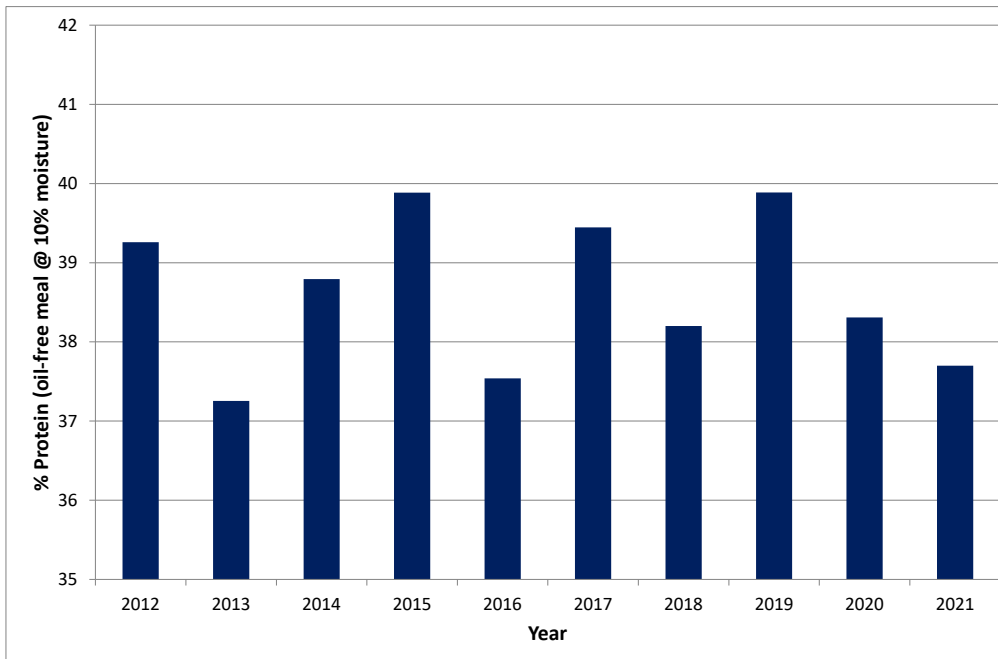


Bars indicate the standard deviation for each state. Red line indicates the AOF base level oil content of 42%.

Figure 7. Average oil content by state 2021.

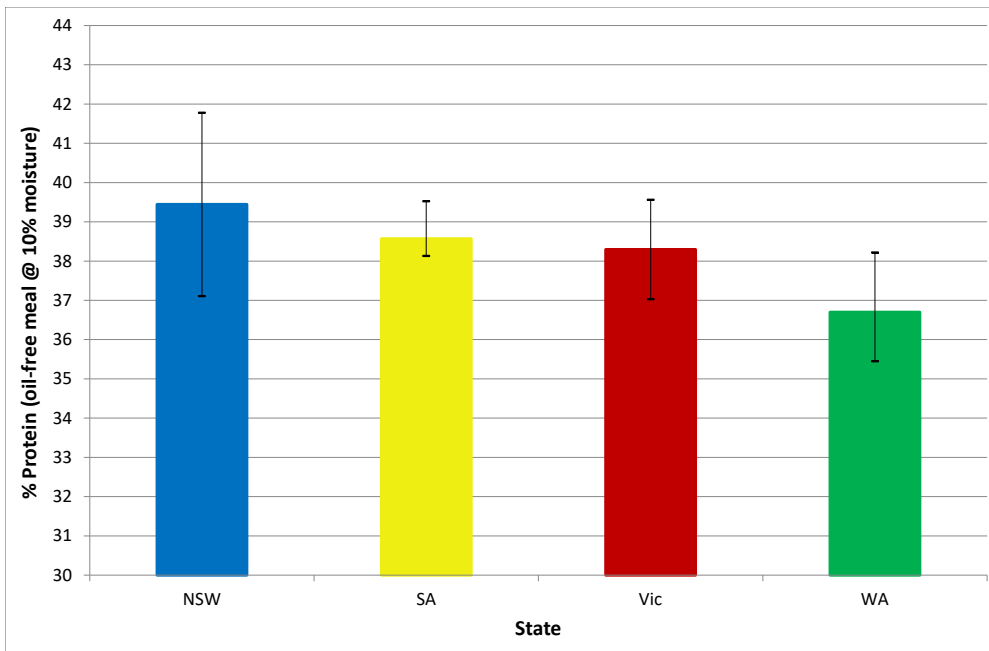
Protein content

The average protein content for the 2021 Australian canola harvest was 37.7%, a decrease of 0.6 percentage points from the 2020 harvest of 38.3%. Protein ranged from 34.8% at Albany in Western Australia to 44.7% at Goondiwindi in southern Queensland. The port zone protein content ranged from 34.8% at Albany in Western Australia to 37.9% at Geraldton in Western Australia. Protein content has been reported as % in oil-free meal @ 10% moisture (figures 8 and 9).



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

Figure 8. Average Australian protein content 2012–2021.



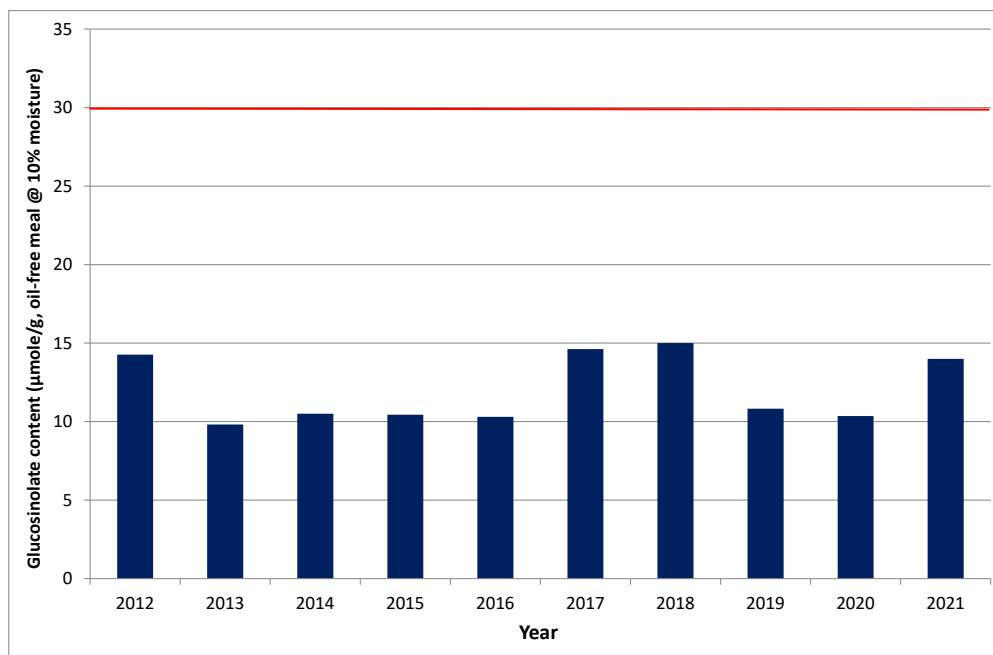
Bars indicate the standard deviation for each state.

Figure 9. Average protein content by state 2021.

Glucosinolate content – meal

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

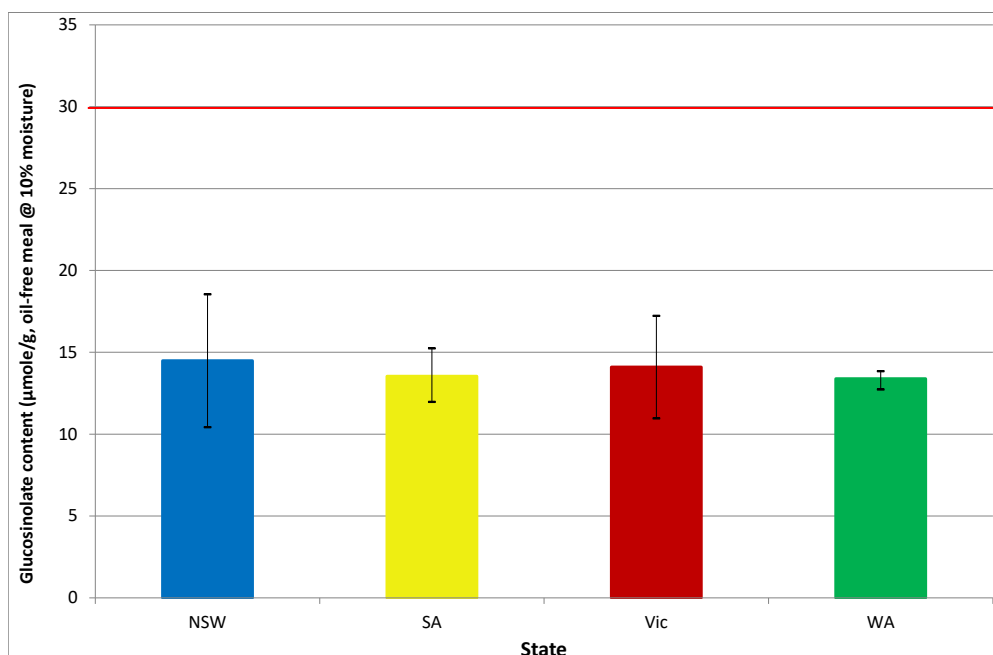
The average glucosinolate content for the Australian harvest in 2021 was 14 $\mu\text{moles/g}$. This was an increase of 4 $\mu\text{moles/g}$ from the 2020 harvest of 10 $\mu\text{moles/g}$. The receival site glucosinolate content ranged from 5 $\mu\text{moles/g}$ at Trundle in New South Wales, to 22 $\mu\text{moles/g}$ at Rand in New South Wales and Quambatook in Victoria (figures 10 and 11).



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

Red line indicates the AOF limit of 30 $\mu\text{moles/g}$ in oil-free meal.

Figure 10. Average Australian glucosinolate content in meal 2012–2021.



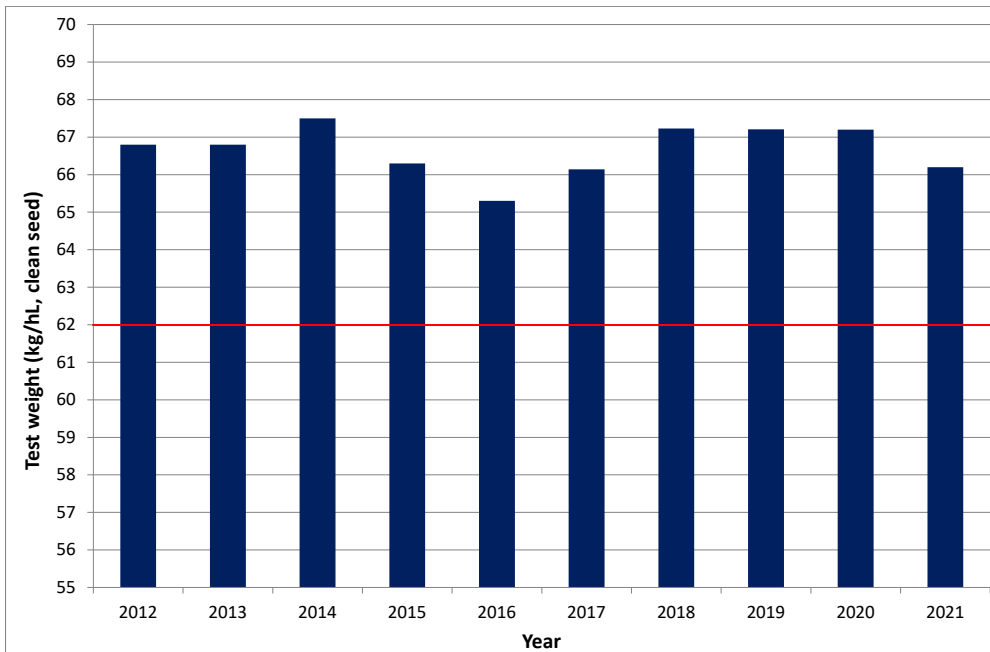
Bars indicate the standard deviation for each state.

Red line indicates the AOF limit of 30 $\mu\text{moles/g}$ in oil-free meal.

Figure 11. Average glucosinolate content in meal by state 2021.

Test weight

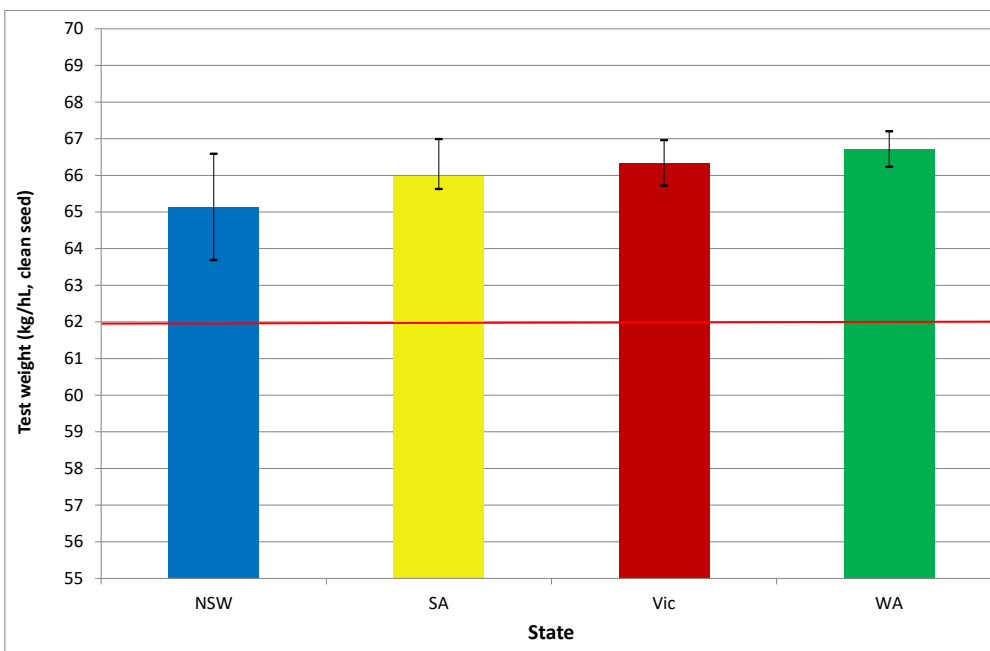
The average test weight for the Australian harvest in 2021 was 66.2 kg/hL. This was a decrease of 1.0 kg/hL from the 2020 harvest of 67.2 kg/hL. The receival site test weight ranged from 61.6 kg/hL at Ardlethan in New South Wales (CAN+CANTW grade; see [Definitions](#)), to 67.8 kg/hL at Coonalpyn in South Australia and Quambatook in Victoria. Test weight has been reported as kg/hL on clean seed (figures 12 and 13).



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

Red line indicates the AOF limit of 62.0 kg/hL.

Figure 12. Average Australian test weight on clean seed 2012–2021.



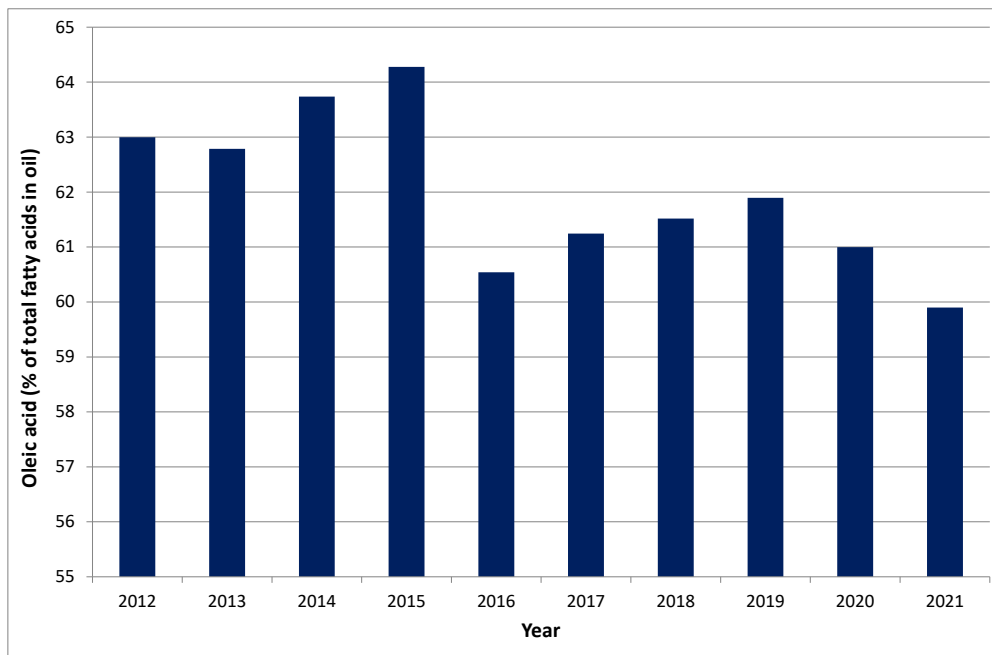
Bars indicate the standard deviation for each state.

Red line indicates the AOF limit of 62.0 kg/hL.

Figure 13. Average test weight on clean seed by state 2021.

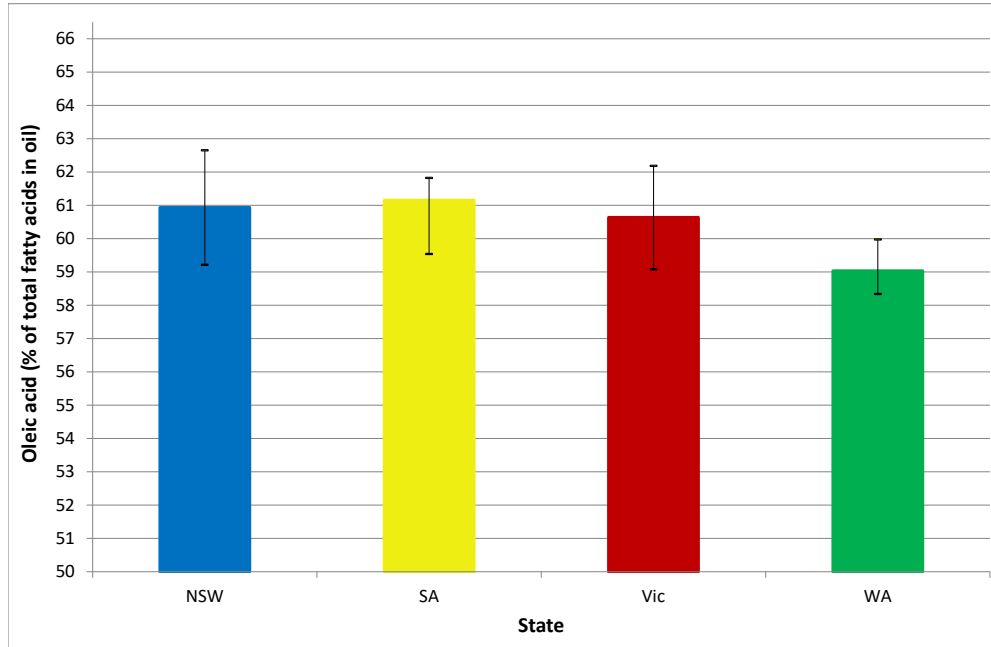
Oleic acid

The average Australian oleic acid (C18:1) content from the 2021 harvest was 59.9%. This was a decrease of 1.1 percentage points from the 2020 season of 61.0%. Oleic acid ranged from 58.2% at Berrybank in Victoria to 67.6% at Tandarra (Monola grade; see [Definitions](#)) in Victoria. Fatty acids are reported as a percentage of total fatty acids (figures 14 and 15).



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

Figure 14. Average Australian percentage of oleic acid in canola oil 2012–2021.

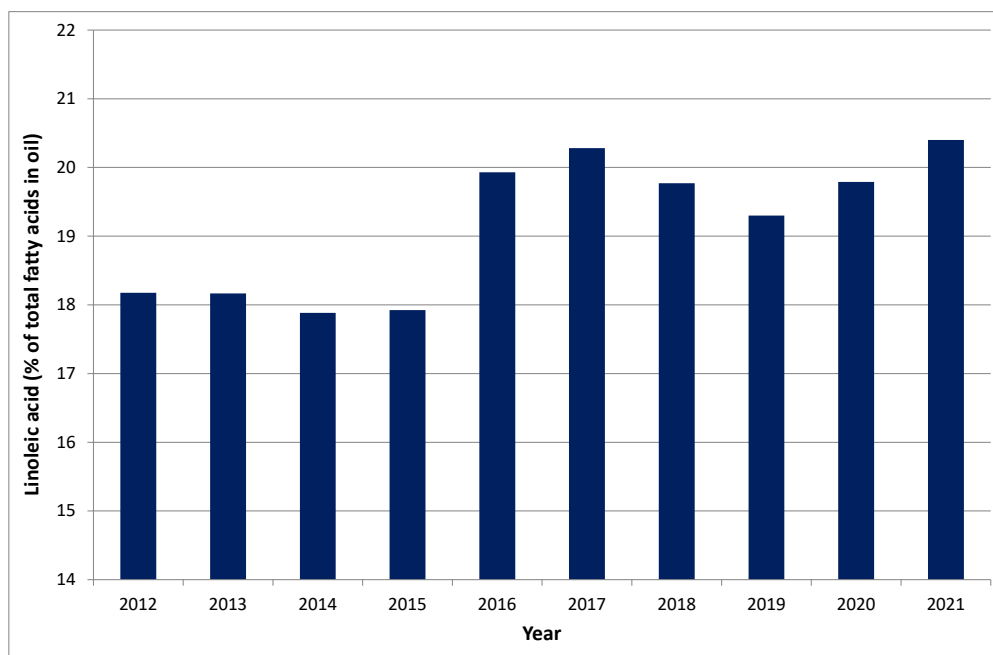


Bars indicate the standard deviation for each state.

Figure 15. Average percentage of oleic acid in canola oil by state 2021.

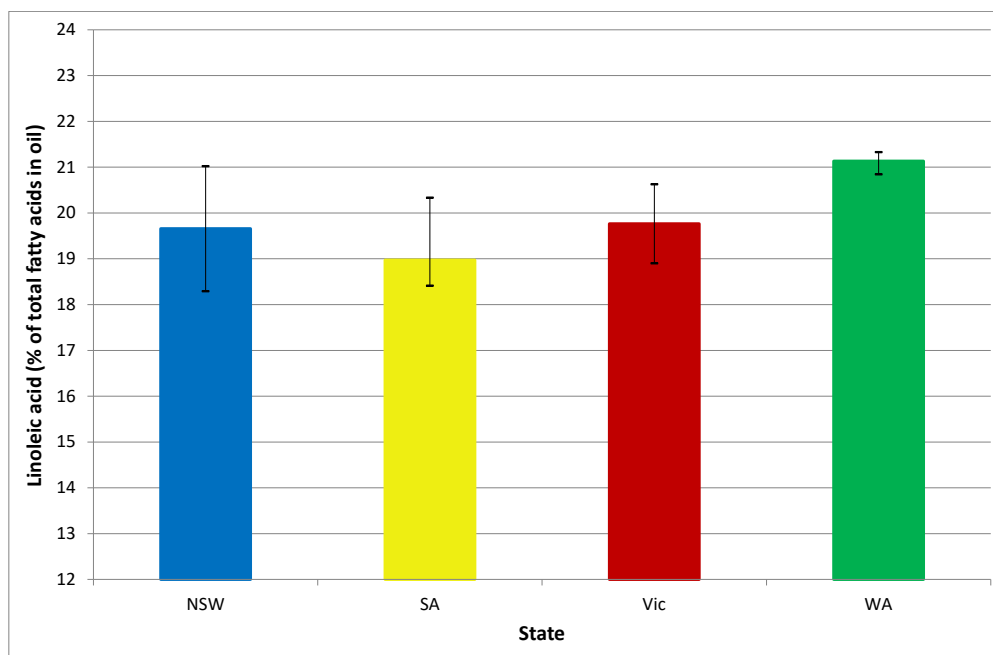
Linoleic acid

The average Australian linoleic acid (C18:2) content from the 2021 harvest was 20.4%. This was an increase of 0.6 percentage points from the 2020 season of 19.8%. Linoleic acid ranged from 16.2% at Moree Sub in New South Wales to 21.6% at Trundle in New South Wales. Fatty acids are reported as a percentage of total fatty acids (figures 16 and 17).



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

Figure 16. Average Australian percentage of linoleic acid in canola oil 2012–2021.

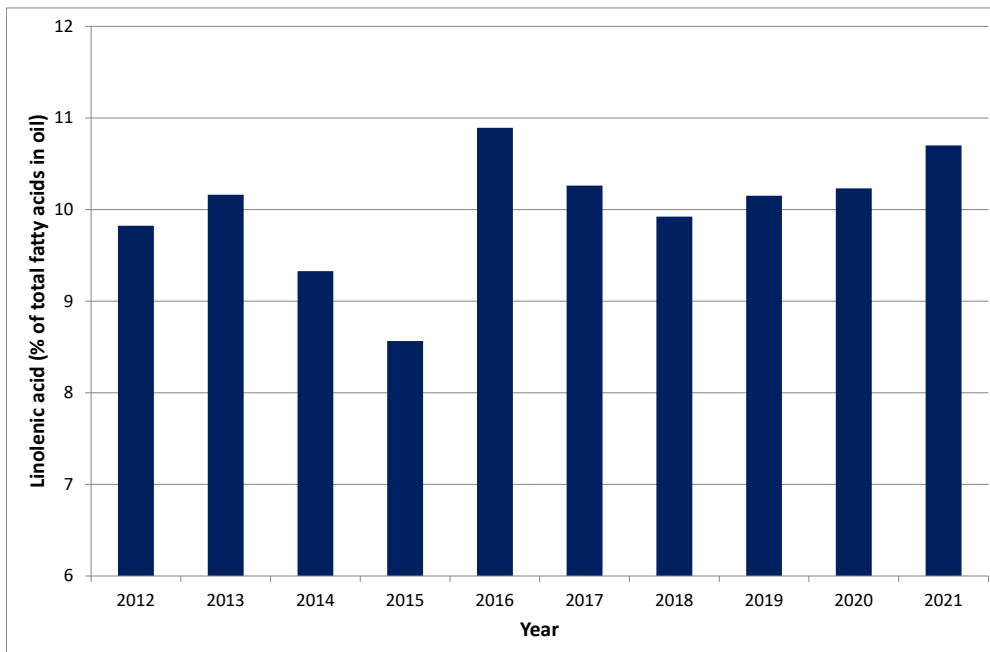


Bars indicate the standard deviation for each state.

Figure 17. Average percentage of linoleic acid in canola oil by state 2021.

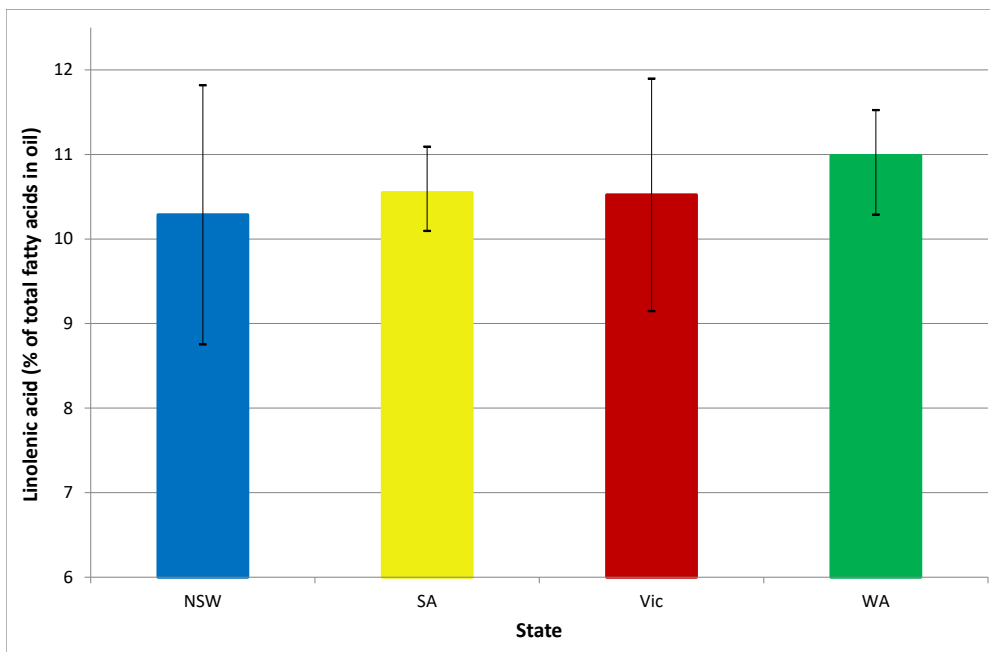
Linolenic acid

The average Australian linolenic acid (C18:3) content from the 2021 harvest was 10.7%. This was an increase of 0.5 percentage points from the 2020 season of 10.2%. Linolenic acid ranged from 3.4 at Gilgandra (Monola grade) in New South Wales to 12.4 % at Berrybank in Victoria. Fatty acids are reported as a percentage of total fatty acids (figures 18 and 19).



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

Figure 18. Average Australian percentage of linolenic acid in canola oil 2012–2021.

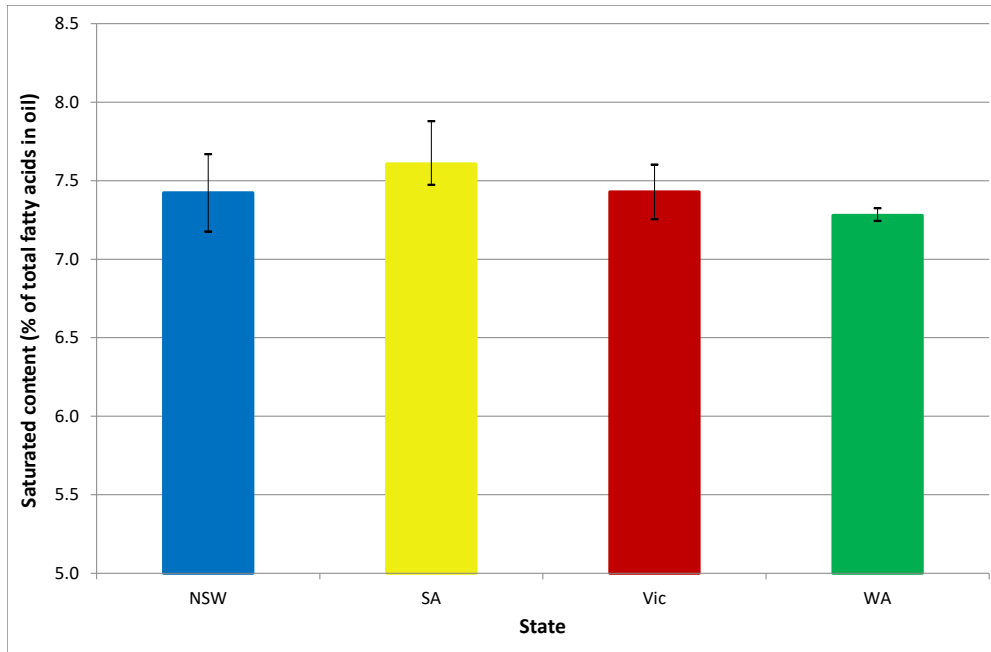


Bars indicate the standard deviation for each state.

Figure 19. Average percentage of linolenic acid in canola oil by state 2021.

Saturated fatty acids

The average Australian saturated fatty acids content from the 2021 harvest was 7.3%, unchanged from the 2020 season. Saturated fatty acids ranged from 6.9% at Tandarra (Monola grade) in Victoria to 8.1% at Dooen in South Australia. Fatty acids are reported as a percentage of total fatty acids (Figure 20).

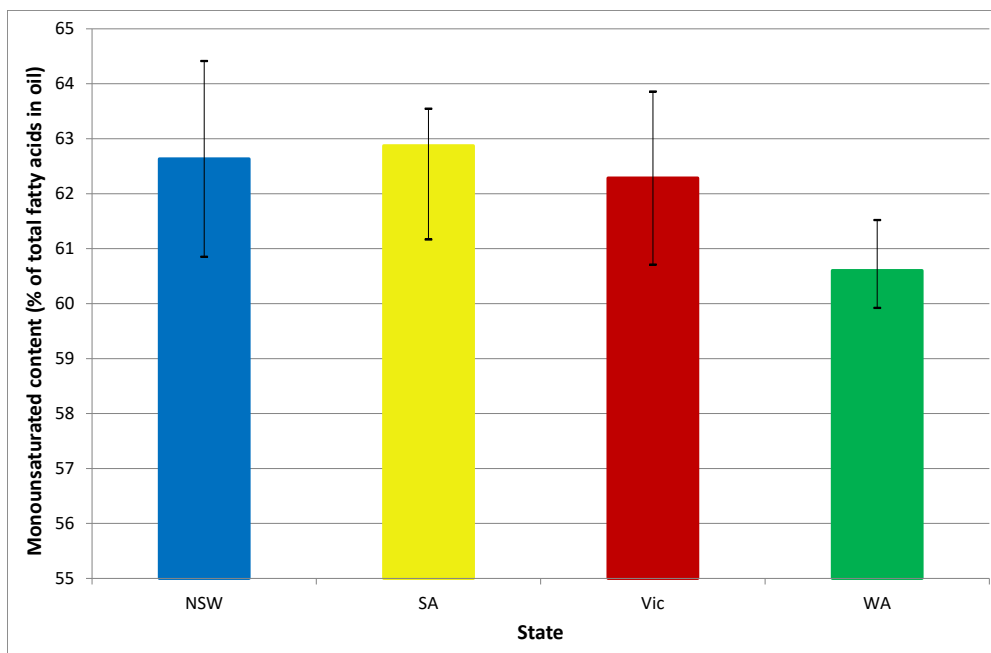


Bars indicate the standard deviation for each state.

Figure 20. Average percentage of saturated fatty acids in canola oil by state 2021.

Monounsaturated fatty acids

The average Australian monounsaturated fatty acids content from the 2021 harvest was 61.5%. This was a decrease of 1.2 percentage points from the 2020 harvest of 62.7%. Monounsaturated fatty acids ranged from 60.0% at Berrybank in Victoria to 69.4% at Tandarra (Monola grade) in Victoria. Fatty acids are reported as a percentage of total fatty acids (Figure 21).

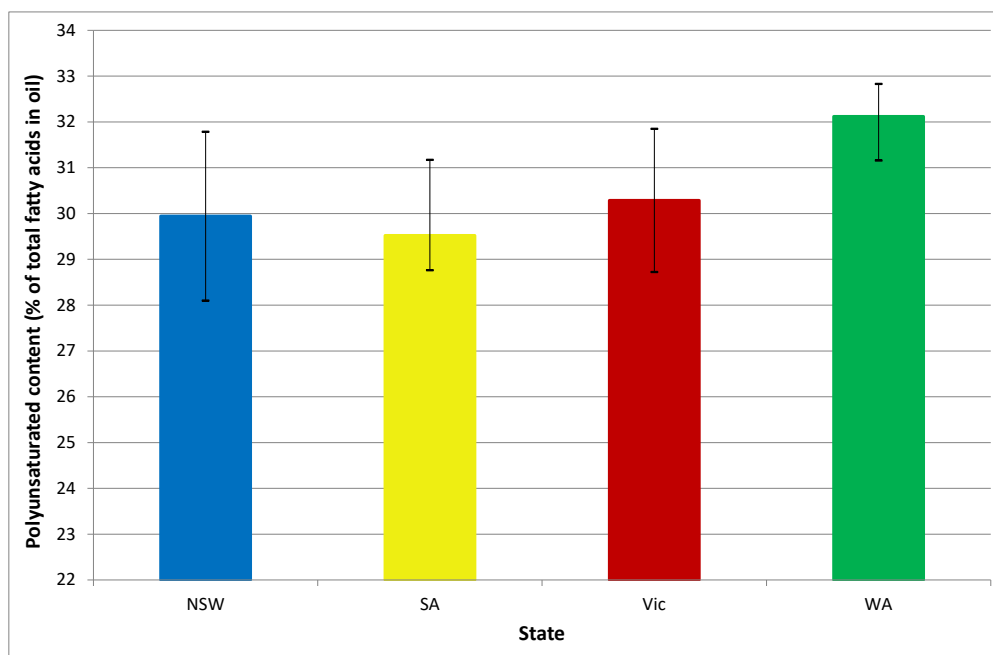


Bars indicate the standard deviation for each state.

Figure 21. Average percentage of monounsaturated fatty acids in canola oil by state 2021.

Polyunsaturated fatty acids

The average Australian polyunsaturated fatty acids content from the 2021 harvest was 31.2%. This was an increase of 1.2 percentage points from the 2020 harvest of 30.0%. Polyunsaturated fatty acids ranged from 23.7% at Tandarra (Monola grade) in Victoria to 32.7% at Berrybank in Victoria and Esperance in western Australia. Fatty acids are reported as a percentage of total fatty acids (Figure 22).

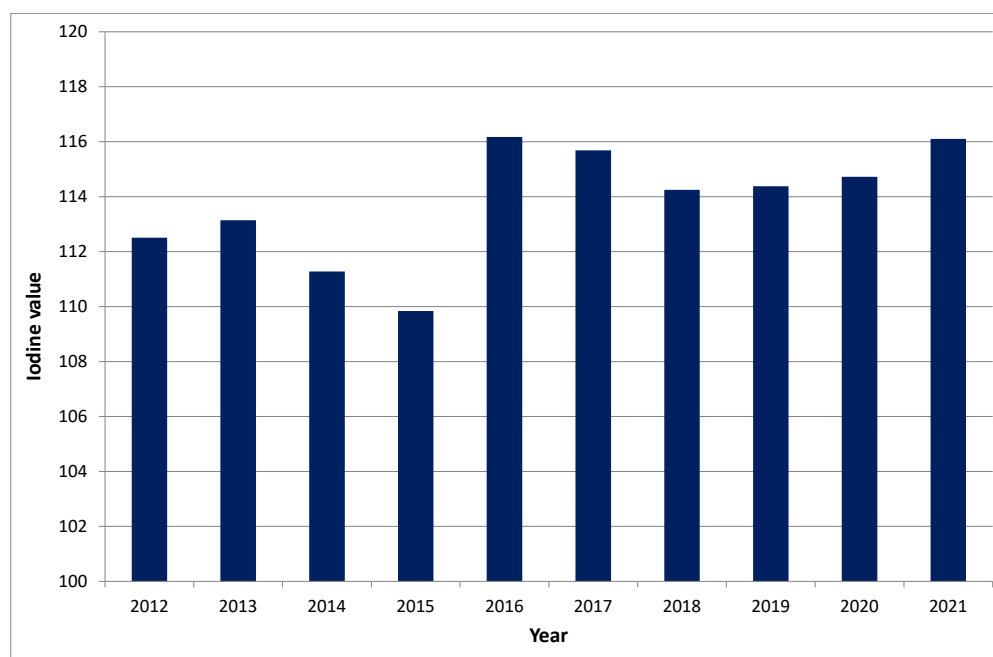


Bars indicate the standard deviation for each state.

Figure 22. Average percentage of polyunsaturated fatty acids in canola oil by state 2021.

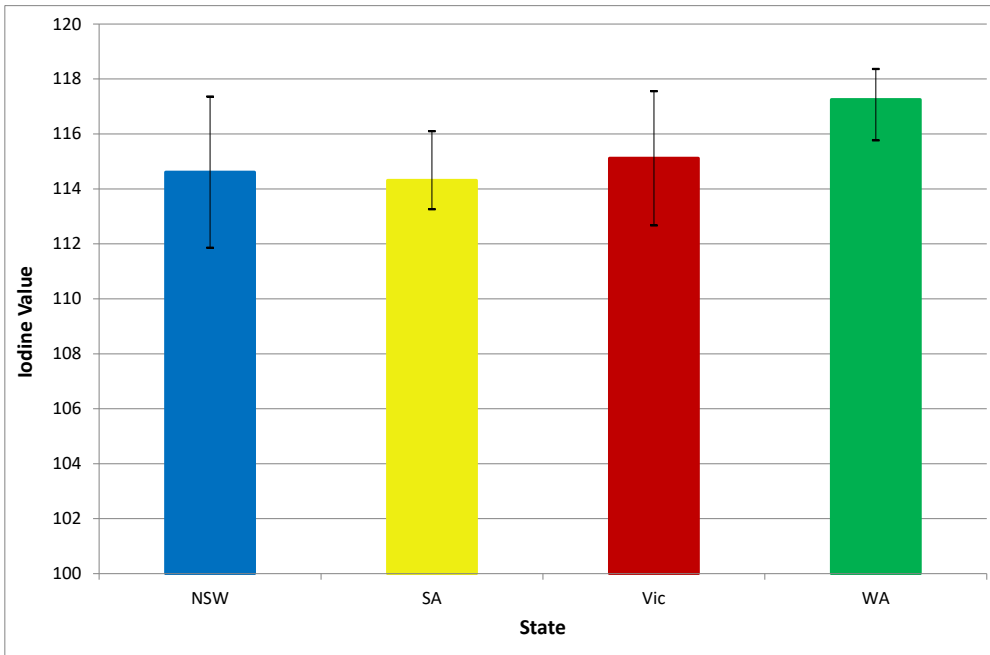
Iodine value

The average Australian iodine value in the oil portion of the seed from the 2021 harvest was 116.1. This was an increase of 1.4 from the 2020 harvest at 114.7. The iodine value ranged from 103.5 at Tandarra (Monola grade) in Victoria to 118.9 at Berrybank in Victoria (figures 23 and 24).

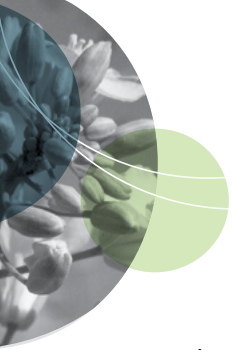


The 2014 and 2015 averages were determined with NSW, SA & Vic results only.

Figure 23. Average Australian iodine value in canola oil 2012–2021.

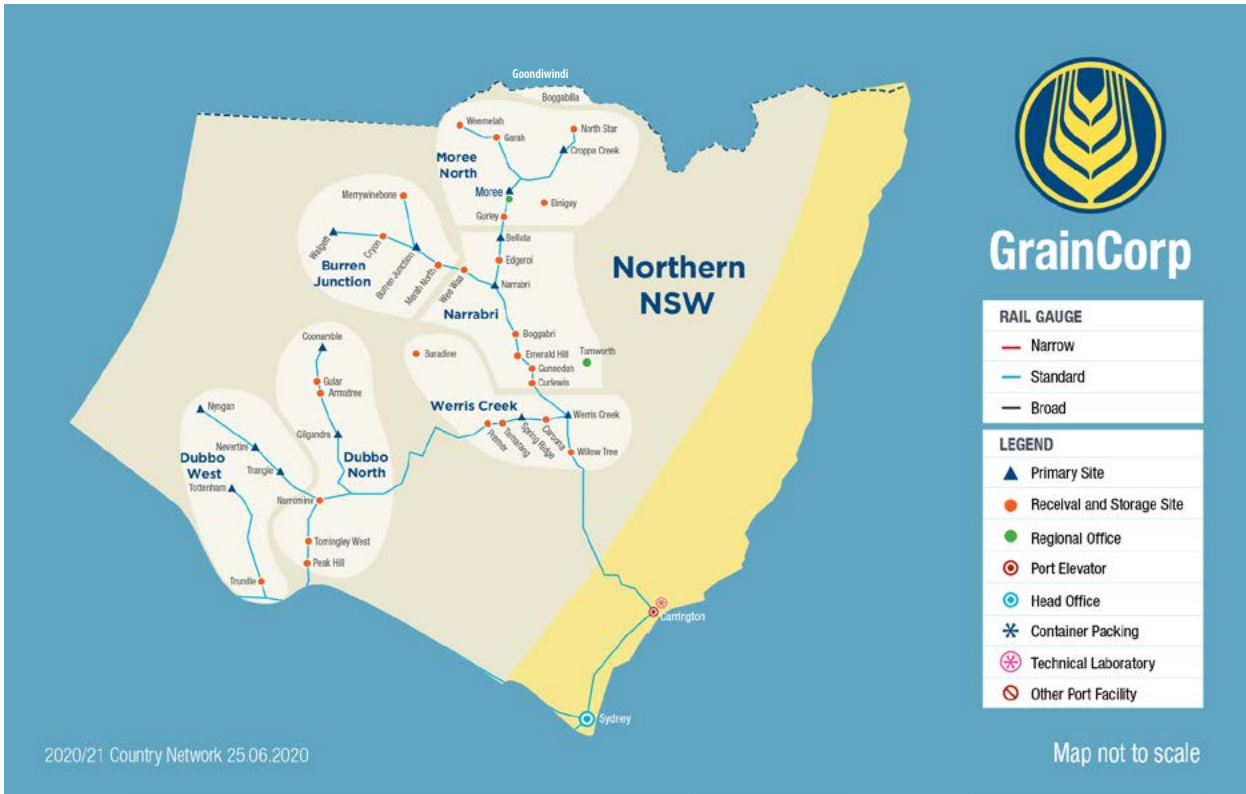


Bars indicate the standard deviation for each state.
Figure 24. Average iodine value in canola oil by state 2021.

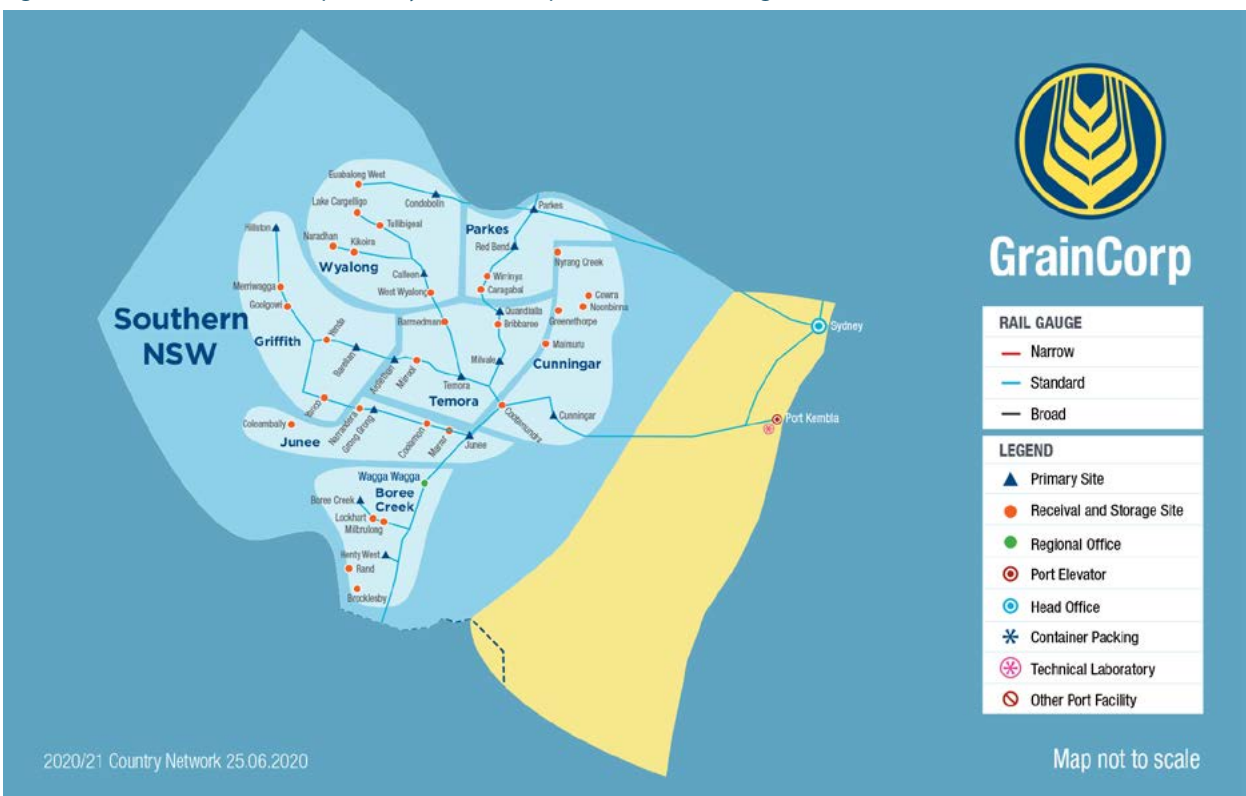


Receival sites by state

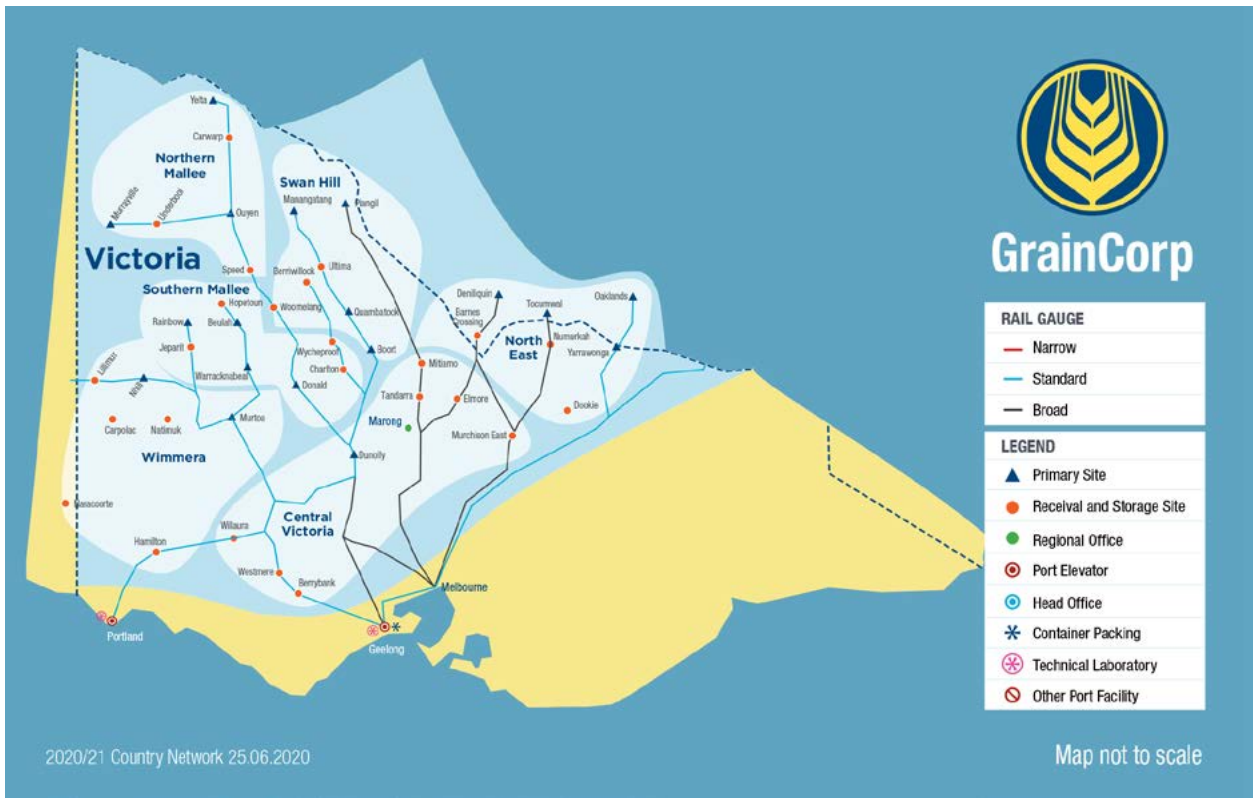
In each state the bulk handlers group the receival sites into Zones and Regions. Results are reported according to these Zones and Regions (figures 25–29).



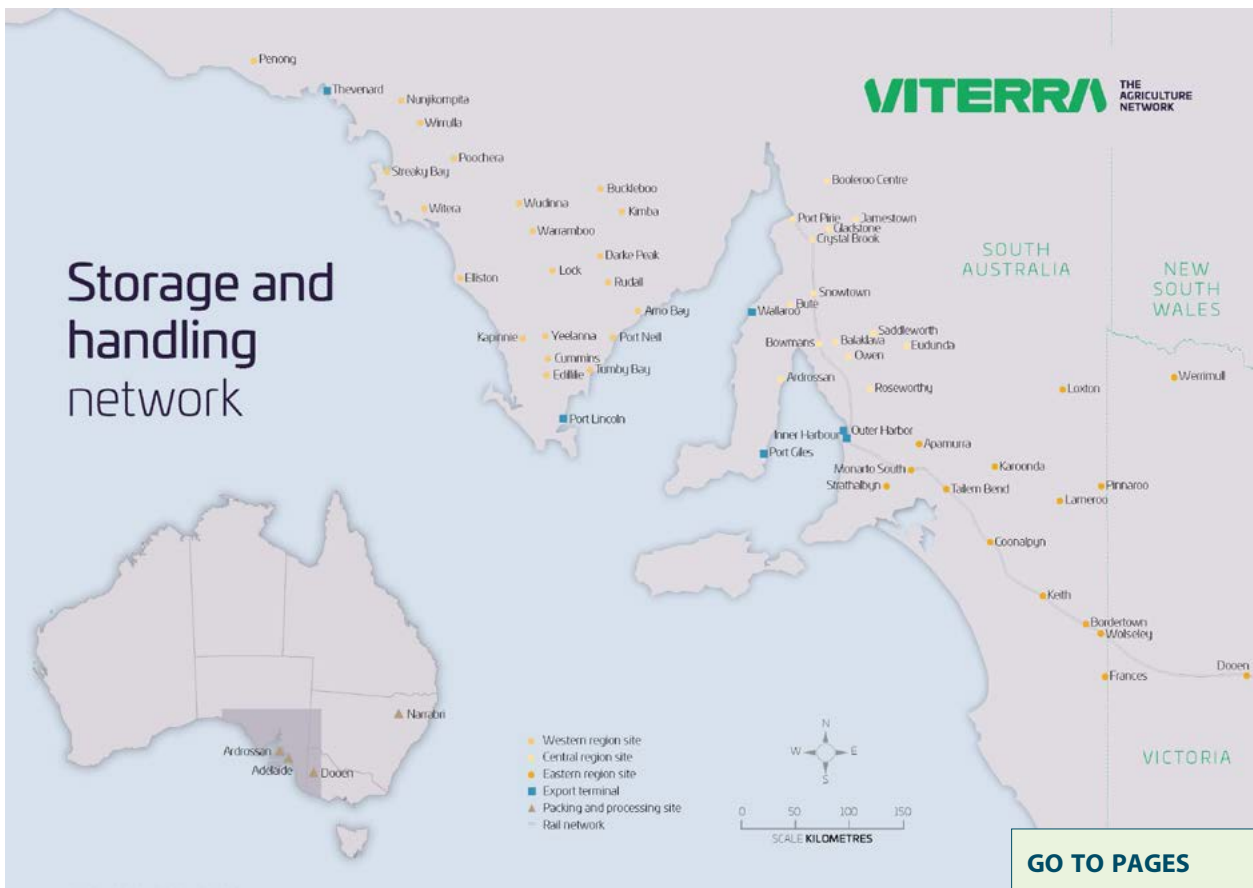
Source: GrainCorp
Figure 25. 2020–2021 GrainCorp Country Network map of northern NSW regions.



Source: GrainCorp
Figure 26. 2020–2021 GrainCorp Country Network map of Southern NSW regions.



Source: GrainCorp
 Figure 27. 2020–2021 GrainCorp Country Network map of Victorian regions.



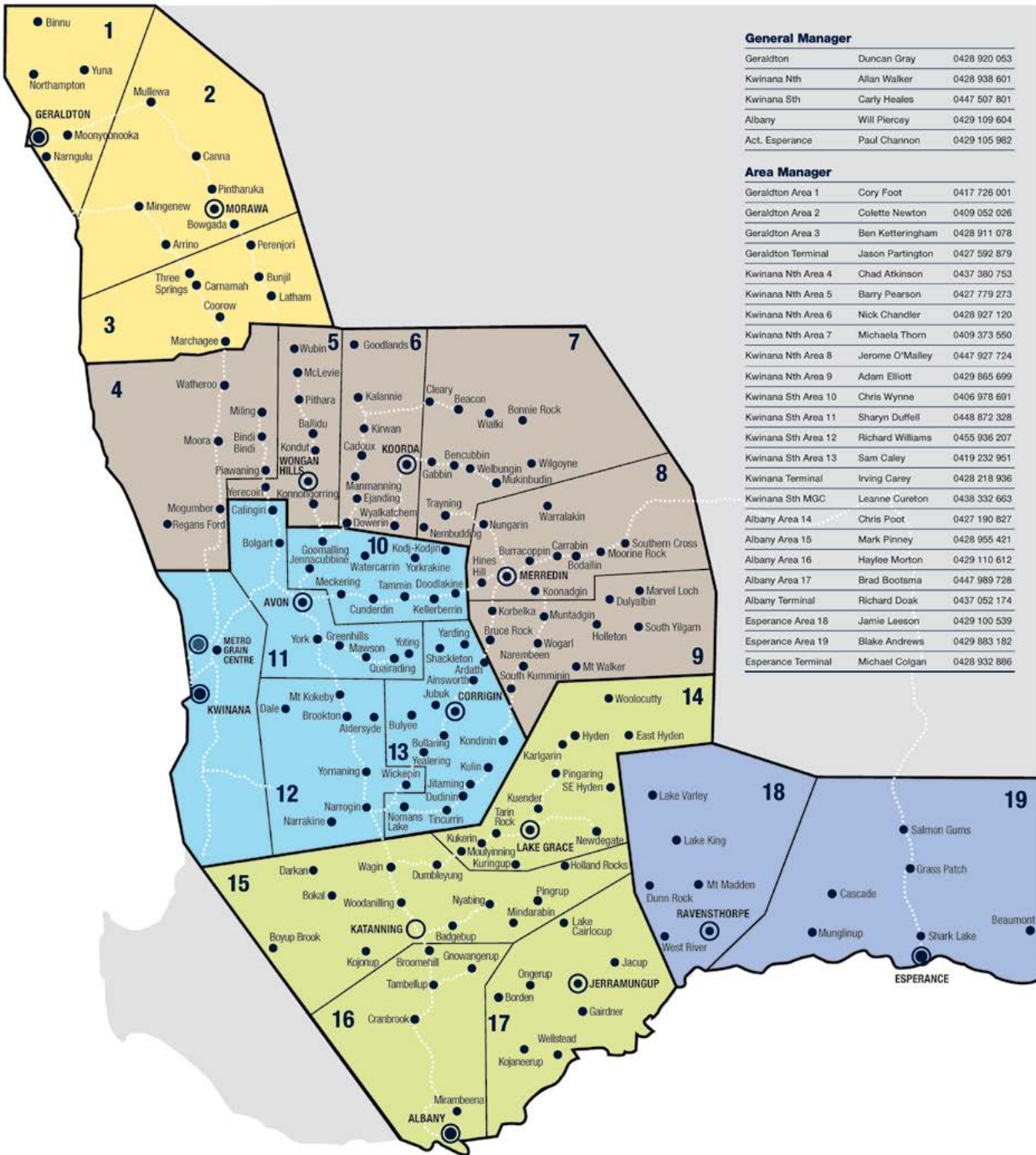
Source: Viteria
 Figure 28. Viteria storage and handling network map.

GO TO PAGES

GrainCorp
<https://grains.graincorp.com.au/wp-content/uploads/2021/02/2020-2021-Country-Network-Map.pdf>

Viteria
<https://www.viteria.com.au/>

Receival Sites



- Network Site
 - Head Office
 - CBH Port Terminal
 - CBH Office
-
- GERALDTON ZONE
 - KWINANA NORTH ZONE
 - KWINANA SOUTH ZONE
 - ALBANY ZONE
 - ESPERANCE ZONE



September 2021

Source: CBH Group
Figure 29. 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
Queensland					
Goondiwindi					
Boggabilla	CAN	45.7	43.5	9	67.5
Goondiwindi	CAN	45.6	44.7	12	67.0
Northern NSW					
Dubbo North					
Gilgandra	CAN	46.0	41.9	12	67.0
Gilgandra	MONO	46.6	42.5	18	67.0
Narromine	MONO	47.0	42.0	8	66.5
Dubbo West					
Nevertire	CAN	47.6	43.2	14	67.5
Trangie	CAN	47.1	43.0	12	66.5
Moree North					
Moree Sub	CAN	46.8	41.4	8	66.3
Narrabri					
Gunnedah	CAN	45.7	40.6	12	66.5
Werris Creek					
Caroona	CAN	46.9	42.0	11	65.0
Premer	CAN	45.8	42.1	7	67.0
Werris Creek Sub	CAN	45.2	42.2	11	65.8
Willow Tree	CAN	46.5	42.0	11	65.8
Northern NSW weighted average ^⑤		46.4	42.3	12	66.6
Southern NSW					
Boree Creek					
Boree Creek	CAN	47.5	42.9	13	64.1
Henty West	CAN + CANTW	47.1	38.1	19	65.5
Milbrulong	CAN + CANTW	48.0	40.1	13	63.0
Rand	CAN	46.3	36.7	22	66.0
Cunningar					
Boorowa	CAN	46.7	38.0	18	66.5
Cootamundra	CAN	46.6	38.3	14	65.9
Cowra	CAN	46.7	37.8	18	65.3
Cunningar	CAN	47.1	37.7	21	65.8
Greenethorpe	CAN	46.9	37.0	21	65.9
Maimuru	CAN	46.9	38.2	12	66.0
Griffith					
Barellan	CAN	48.0	40.4	15	64.1
Tabbita	CAN	47.2	44.0	16	66.1
Junee					
Coolamon	CAN + CANTW	47.7	39.8	17	63.9
Junee Sub	CAN	47.1	36.4	19	65.6
Matong	CAN	47.2	39.6	18	64.0
Narrandera	CAN + CANTW	47.4	39.6	16	64.0
Parkes					
Caragabal	CAN	47.6	36.5	9	64.4
Parkes Sub	CAN + CANTW	45.9	38.0	15	63.0
Red Bend	CAN	46.0	38.4	17	63.8
Trundle	CAN	49.3	40.4	5	65.9
Temora					
Ardlethan	CAN + CANTW	47.5	40.0	16	61.6
Bribbaree	CAN + CANTW	46.8	37.5	13	63.9
Milvale	CAN	47.4	37.6	16	64.0
Quandialla	CAN	47.4	39.5	12	63.8
Temora Sub	CAN	46.7	35.8	18	64.9
Wyalong					
Calleen	CAN	48.1	39.7	13	62.9
Condobolin	CAN	46.9	40.7	17	65.6
Wyalong	CAN	47.9	40.5	13	63.0
Southern NSW weighted average		47.1	38.6	15	64.7
NSW ^⑤ weighted average		46.9	39.4	14	65.1
NSW* minimum		45.2	35.8	5	61.6
NSW* maximum		49.3	44.7	22	67.5

- 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.
- ⑤ Includes data from 2 sites in southern Queensland

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	44.4	38.6	14	65.8
Central					
Ardrossan	CAGM	44.6	39.8	14	67.0
Bowmans	CANO	44.7	38.5	14	66.0
Gladstone	CANO	44.2	39.9	12	65.5
Owen	CAGM	45.7	39.2	12	66.0
Port Giles	CANO	45.2	38.7	12	66.3
Port Pirie	CAGM	45.7	39.2	16	66.5
Roseworthy	CANO	44.5	37.8	13	66.0
Eastern					
Bordertown	CAGM	45.0	38.1	13	67.3
Coonalpyn	CAGM	44.7	40.2	17	67.8
Dooen	CANO	43.9	37.5	15	66.8
Frances	CANO	44.7	38.6	10	67.0
Keith	CANO	44.5	38.9	15	67.0
Tailem Bend	CANO	44.6	38.7	15	65.8
Wolseley	CANO	43.8	39.0	12	67.0
Western					
Cummins	CANO	45.4	38.2	14	65.8
Edillilie	CAGM	46.4	39.1	13	66.0
Port Lincoln	CANO	45.9	38.1	12	65.0
Port Neill	CAGM	44.9	39.1	14	66.3
Rudall	CANO	42.6	39.6	15	66.3
Tumby Bay	CANO	44.8	38.6	12	65.8
SA weighted average		44.9	38.6	14	66.0
SA minimum		42.6	37.5	10	65.0
SA maximum		46.4	40.2	17	67.8

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	47.0	37.1	17	66.3
Central Victoria					
Berrybank	CAN+CANG	47.0	37.1	14	66.3
Dunolly Sub	CAN	46.0	36.8	15	66.0
Elmore	CAN	46.3	38.8	15	66.8
Mitiamo	CAN	44.7	39.3	16	67.0
Murchison East	CAN	46.1	38.7	12	66.5
Tandarra	MONO	47.4	40.7	16	66.3
Westmere	CAN+CANG	46.4	36.8	15	66.5
Willaura	CAN	47.9	36.4	10	66.5
North east					
Barnes Crossing	CAN	45.7	40.2	13	66.3
Deniliquin	CAN	45.1	39.2	19	66.8
Dookie	CAN+MONO	46.2	38.0	11	65.8
Numurkah	CAN	45.2	38.7	16	67.0
Oaklands	CAN+CANG	46.3	38.9	9	65.0
Tocumwal	CAN	45.3	40.2	10	65.8
Yarrawonga	CAN+CANG	46.0	38.8	13	64.8
Southern Mallee					
Beulah	CAN	41.9	41.3	15	66.8
Charlton	CAN	45.1	38.6	13	66.0
Donald	CAN	44.6	38.6	14	66.0
Rainbow	CAN	43.4	39.6	16	67.0
Warracknabeal	CAN	43.6	38.9	11	66.3
Wycheproof	CAN	44.0	41.0	21	66.8
Swan Hill					
Boort	CAN	44.9	39.5	12	67.0
Piangil	CAN	44.3	39.9	18	66.5
Quambatook	CAN	42.6	40.0	22	67.8
Wimmera					
Carpolac	CAN	45.1	38.4	13	67.0
Hamilton	CAN	46.7	37.1	17	66.8
Lillimur	CAN	43.8	38.2	9	67.0
Murtoa Sub	CAN	45.4	37.9	16	66.5
Naracoorte	CAN	44.9	37.7	18	67.3
Natimuk	CAN	45.0	37.5	14	67.0
Nhill	CAN	43.8	38.6	16	67.0
VIC weighted average		45.6	38.3	14	66.3
Vic minimum		41.9	36.4	9	64.8
Vic maximum		47.9	41.3	22	67.8

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	48.8	34.8	13	66.0
Esperance	N/A	47.3	37.6	14	66.9
Geraldton	N/A	46.2	37.9	13	67.0
Kwinana	N/A	47.5	37.0	13	67.0
WA weighted average		47.6	36.7	13	66.7
WA minimum		46.2	34.8	13	66.0
WA maximum		48.8	37.9	14	67.0

① % in whole seed @ 6% moisture

② % in oil-free meal @ 10% moisture

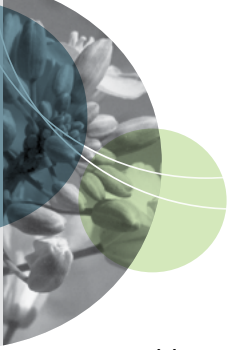
③ µmoles/g in oil-free meal @ 10% moisture

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
Queensland																			
Goondiwindi																			
Boggabilla	0.07	4.0	0.3	0.2	0.2	2.2	63.8	16.5	10.1	0.7	1.2	0.3	<0.1	0.2	0.2	26.6	65.7	7.7	111.3
Goondiwindi West	0.07	4.2	0.3	0.2	0.2	2.3	63.1	17.4	9.7	0.7	1.2	0.4	<0.1	0.2	0.2	27.1	64.9	8.0	111.1
Northern NSW																			
Dubbo North																			
Gilgandra (C)	0.07	4.2	0.3	0.2	0.2	2.0	62.7	19.2	8.8	0.6	1.2	0.3	<0.1	0.1	0.2	28.0	64.5	7.5	111.4
Gilgandra (M)	0.06	4.1	0.3	0.1	0.1	1.8	66.9	20.7	3.4	0.6	1.2	0.3	<0.1	0.1	0.1	24.2	68.7	7.1	103.8
Narromine	0.05	4.0	0.3	0.1	0.1	1.8	67.2	20.2	3.6	0.6	1.3	0.3	<0.1	0.2	0.2	23.8	69.0	7.2	103.6
Dubbo West																			
Nevertire	0.07	4.2	0.3	0.2	0.1	1.8	60.5	20.2	10.5	0.5	1.1	0.3	<0.1	0.1	0.1	30.7	62.1	7.2	115.7
Trangie	0.07	4.4	0.3	0.2	0.1	1.9	59.5	20.9	10.6	0.5	1.1	0.3	<0.1	0.1	0.1	31.5	61.1	7.4	116.2
Moree North																			
Moree Sub	0.07	4.0	0.3	0.2	0.2	2.2	64.1	16.2	10.2	0.6	1.2	0.3	<0.1	0.2	0.2	26.4	65.9	7.7	111.3
Narrabri																			
Gunnedah	0.07	4.2	0.3	0.2	0.2	2.1	61.8	18.1	10.5	0.6	1.2	0.3	<0.1	0.2	0.2	28.7	63.7	7.6	113.5
Werris Creek																			
Caroona	0.07	4.1	0.3	0.2	0.2	2.1	62.3	17.8	10.2	0.7	1.2	0.4	<0.1	0.2	0.2	28.1	64.2	7.7	112.6
Premier	0.07	4.2	0.3	0.2	0.2	2.1	63.0	17.0	10.5	0.7	1.2	0.3	<0.1	0.2	0.2	27.4	64.8	7.8	112.3
Werris Creek Sub	0.07	4.1	0.3	0.2	0.2	2.1	62.7	17.0	10.7	0.7	1.2	0.3	<0.1	0.2	0.2	27.7	64.6	7.7	112.8
Willow Tree	0.07	4.1	0.3	0.2	0.2	2.2	63.2	16.9	10.3	0.7	1.2	0.3	<0.1	0.1	0.2	27.2	65.0	7.8	112.0
Northern NSW * weighted average	0.07	4.2	0.3	0.2	0.2	2.0	62.5	18.7	9.5	0.6	1.2	0.3	<0.1	0.1	0.2	28.2	64.3	7.5	112.3
Southern NSW																			
Boree Creek																			
Boree Creek	0.08	4.6	0.3	0.2	0.1	2.0	60.2	20.3	10.1	0.6	1.0	0.3	<0.1	0.1	0.1	30.4	61.8	7.8	114.5
Henty West	0.06	4.4	0.3	0.2	0.1	1.8	60.2	19.7	10.9	0.7	1.1	0.3	<0.1	0.1	0.2	30.6	61.9	7.5	115.6
Milbrulong	0.07	4.5	0.3	0.2	0.1	2.0	60.4	20.1	10.1	0.6	1.1	0.3	<0.1	0.1	0.1	30.1	62.1	7.8	114.3
Rand	0.06	4.5	0.3	0.2	0.2	1.7	61.5	19.8	9.5	0.6	1.1	0.3	<0.1	0.1	0.1	29.3	63.1	7.6	113.3
Cunningar																			
Boorowa	0.06	4.4	0.3	0.2	0.2	1.6	61.0	20.3	9.8	0.5	1.1	0.3	<0.1	0.1	0.1	30.1	62.8	7.1	114.5
Cootamundra	0.06	4.3	0.3	0.2	0.2	1.9	60.4	19.5	10.8	0.7	1.2	0.3	<0.1	0.1	0.1	30.2	62.2	7.6	115.1
Cowra	0.06	4.3	0.3	0.2	0.1	1.8	60.9	19.6	10.5	0.6	1.1	0.3	<0.1	0.1	0.1	30.1	62.6	7.3	115.0
Cunningar	0.06	4.5	0.3	0.2	0.2	1.7	60.1	20.4	10.4	0.6	1.2	0.3	<0.1	0.1	0.1	30.8	61.9	7.3	115.5
Greenethorpe	0.06	4.4	0.3	0.2	0.2	1.8	60.8	20.2	9.9	0.6	1.1	0.3	<0.1	0.1	0.1	30.1	62.5	7.4	114.3
Maimuru	0.07	4.3	0.3	0.2	0.2	2.0	60.1	19.2	11.4	0.6	1.1	0.3	<0.1	0.1	0.1	30.6	61.8	7.6	116.0
Griffith																			
Barellan	0.07	4.3	0.3	0.2	0.1	1.8	59.9	20.6	10.6	0.5	1.2	0.3	<0.1	0.1	0.1	31.2	61.6	7.2	116.2
Tabbita	0.07	4.3	0.3	0.2	0.1	1.9	61.4	18.7	11.1	0.5	1.1	0.2	<0.1	0.1	0.1	29.8	63.0	7.2	115.3
Junee																			
Coolamon	0.07	4.4	0.3	0.2	0.1	1.9	61.0	20.2	9.9	0.5	1.1	0.3	<0.1	0.1	0.1	30.0	62.6	7.4	114.4
Junee Sub	0.06	4.3	0.2	0.2	0.2	1.6	61.3	19.6	10.2	0.5	1.2	0.3	<0.1	0.1	0.1	29.8	63.1	7.1	114.7
Matong	0.07	4.4	0.3	0.2	0.1	1.8	60.7	20.2	10.1	0.5	1.2	0.3	<0.1	0.1	0.1	30.3	62.4	7.3	114.9
Narrandera	0.07	4.5	0.3	0.1	0.1	1.8	60.5	20.6	9.9	0.5	1.1	0.3	<0.1	0.1	0.1	30.5	62.1	7.4	114.8
Parkes																			
Caragabal	0.06	4.1	0.2	0.1	0.1	1.9	60.3	21.1	10.0	0.5	1.1	0.3	<0.1	0.1	0.1	31.1	61.9	7.0	115.7
Parkes Sub	0.07	4.3	0.3	0.2	0.2	1.9	61.3	19.2	10.4	0.6	1.1	0.3	<0.1	0.1	0.1	29.6	63.0	7.4	114.5
Red Bend	0.07	4.5	0.3	0.2	0.1	1.8	60.2	20.9	9.8	0.5	1.1	0.3	<0.1	0.1	0.1	30.7	61.8	7.5	114.9
Trundle	0.06	4.2	0.2	0.1	0.1	1.8	60.0	21.6	9.8	0.5	1.1	0.3	<0.1	0.1	0.1	31.4	61.6	7.0	115.9



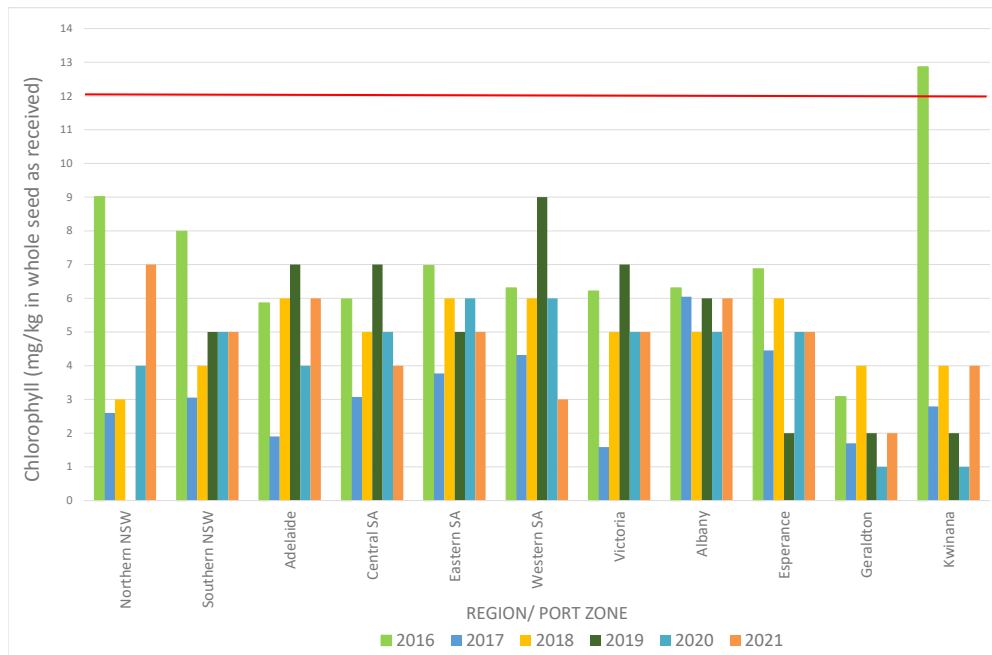
Chlorophyll

Table 11 and Figure 30 show the average chlorophyll content for the Australian harvest in 2021 was 5 mg/kg (5 ppm) in whole seed as received. This was an increase of 1 mg/kg (1 ppm) from the 2020 harvest of 4 mg/kg (4 ppm).

Table 11. Chlorophyll by region/ port zone.

State	Region/port zone	Chlorophyll (mg/kg) ¹
NSW	Northern	7
NSW	Southern	5
SA	Adelaide	6
SA	Central	4
SA	Eastern	5
SA	Western	3
Vic	Victoria	7
WA	Albany	6
WA	Esperance	5
WA	Geraldton	2
WA	Kwinana	4
Australian weighted average		5

¹ mg/kg in whole seed as received.



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

Figure 30. Average chlorophyll content by region/ port zone 2016–2021.



Definitions, methods and references

Definitions

Canola (CAN/CANO)

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 Viterro Pty Ltd.

The AOF *Quality standards, technical information and typical analysis* (2021–22). Standard reference for canola is CSO 1; standard Reference for non-GM canola is CSO 1-a.

GM canola (CAGM/CANG)

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

Canola + Canola Test Weight (CAN + CANTW)

Sites where canola with acceptable test weight and canola with low test weight have been identified. Canola of both types were proportionally combined to provide a representative sample from that site.

Monola (MONO)

A grade of canola that, through selective breeding, yields an oil high in oleic acid and low in linolenic acid.

OGTR Office of the gene regulator.

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 4 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 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.

GOTO PAGES

AOF *Quality standards, technical information and typical analysis* (2021–22) (http://www.australianoilseeds.com/__data/assets/pdf_file/0004/24088/2021-22_AOF_Standards_V20_1_August_2021_FINAL.pdf)

OGTR (<https://www.ogtr.gov.au/>)

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 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 μ moles glucosinolates/gram in oil-free meal at 10% moisture.

Test weight

Test weight is a measure of the bulk density or volume of the oilseeds based on the entire sample as received, measured in kilogram per hectolitre, kg/hL. The seed is measured using a Franklin chondrometer with the result recorded.

Note: For this publication the test weight is analysed on a clean seed basis.

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'.

Chlorophyll content

Chlorophyll content was 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 solution'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 and typical analysis* (2021–22) Issue 20, 1 August 2021.

