



SOUTHERN

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GRAINS RESEARCH
& DEVELOPMENT
CORPORATION

LUPIN

SECTION 11

GRAIN MARKETS

OVERVIEW | EXPORT DESTINATIONS | DOMESTIC MARKETS | HUMAN
CONSUMPTION MARKETS | GRAIN SPECIFICATIONS

MORE INFORMATION

Pulse Australia 'Australian Pulse Standards 2016/2017':
http://pulseaus.com.au/storage/app/media/markets/20160801_Pulse-Standards.pdf

Pulse Australia 'Pulse Traders':
<http://pulseaus.com.au/marketing/pulse-traders>

Pulse Australia 'Australian Crop Forecast': http://www.pulseaus.com.au/storage/app/media/industry/20160613_AU-pulse-crop-forecast.pdf

Pulse Australia 'Australian Pulse Bulletin': <http://pulseaus.com.au/growing-pulses/publications/marketing-pulses>

Grain markets

11.1 Overview

It is estimated lupin grain production in South Australia, Victoria and New South Wales reached a total of about 210,300 tonnes in 2016.

This was made up of an estimated 89,000 t produced from an area of 69,500 hectares in SA; 44,900 t from 33,000 ha in VIC; and 76,400 t from 32,700 ha in NSW.¹

The bulk of annual narrow leafed lupin grain production in the southern region is used on-farm for animal feed or planting seed, or is sold on the domestic market. Most albus lupin is sold for human consumption.

Manufactured and grain-based ruminant (cow and sheep) feed is the biggest end-use for narrow leafed lupin produced in SA, VIC and NSW, followed by feed for pigs and poultry and a small – but increasing – interest from the aquaculture sector.

Australian exports of narrow leafed lupin grain predominantly occur out of the western region.

The Republic of South Korea is the biggest international buyer of Australian narrow leafed lupin and there are smaller export markets in European Union countries and Japan.

Most of these markets use lupin grain for animal feed, although in recent years there has been interest in its use (processed to flour or flakes) for human consumption.

This is because the grain is uniquely high in protein (30-40 percent) and dietary fibre (30 percent) and low in starch, meaning it has a low glycaemic index (GI).

Lupin flour and/or flakes are included in a range of bakery, meat and beverage products in Australia, Europe and some other countries – but these remain mostly niche markets.

In 2014-15, Australia exported about 250,000 t of lupin grain (from November 2014 to October 2015) from total national production of 565,000 t in 2014. This included about 75,000 t in SA, 66,000 t in NSW and 40,000 t in Victoria. These export sales were well down from the decade's peak annual lupin grain exports of about 650,000 t in 2011-12, when national production was about 901,000 t.²

Lupin grain generally competes with soybean in the international market for vegetable-based proteins for livestock industries.

Australian lupin has consistently been valued at 70–75 percent of the price of soybean meal in global markets.

Since 2007-08, export prices for lupin grain have fluctuated from about \$225 per tonne in 2011-12 to about \$350/t in 2014-15. This has correlated with high and low Australian production levels, respectively.³

The price of imported vegetable protein, such as soybean meal, canola meal or palm kernel meal, strongly influences the lupin export price.

1 Pulse Australia Australian Pulse Crop Forecast (June, 2016); http://www.pulseaus.com.au/storage/app/media/industry/20160613_AU-pulse-crop-forecast.pdf
2 Pulse Australia Australian Pulse Crop Forecast (June, 2016); http://www.pulseaus.com.au/storage/app/media/industry/20160613_AU-pulse-crop-forecast.pdf
3 Pulse Australia Australian Pulse Crop Forecast (June, 2016); http://www.pulseaus.com.au/storage/app/media/industry/20160613_AU-pulse-crop-forecast.pdf

FEEDBACK

Soybean meal is usually in high supply and can be sourced year-round, enabling forward ordering and regular shipments.

Monthly average prices for narrow leafed lupin on the domestic market in SA since 2011 have fluctuated from a low of about \$150/t in early 2012 (Port Lincoln Free-in-store) to a high of just over \$350/t in mid-2013 and early 2015. In Melbourne, monthly average prices for narrow leafed lupin have ranged from a low of \$250/t in late 2011 to a high of about \$475/t in mid-2013 and mid-2014.⁴

11.2 Export destinations

In recent years, the Republic of South Korea has been the major international buyer of Australian narrow leafed lupin grain. This market has a high-capacity dehulling plant and uses the hulls in animal feed and kernels for pig feed rations.

Other export markets for Australian narrow leafed lupin include the Netherlands, Egypt, Japan and Spain.

Most use the grain for animal feed, although small human food markets are developing for lupin flour and flakes.

The main export market for albus lupin is Egypt, where the grain is consumed as a snack food.

This is a limited market, which has had a total import requirement of about 50,000 t annually in recent years.

Over-production of albus lupin in Australia can exceed Egyptian market requirements and flatten demand accordingly.

Despite similar nutritive value, albus lupin is not as readily accepted into domestic feed markets as Australian narrow leafed lupin.

This is possibly driven by the historically higher price for this grain in export markets, where demand often out-strips production.

11.3 Domestic markets

If growing lupin for sale on the domestic market, it is advised that marketing decisions should factor in Australian seasonal conditions, as these strongly influence farm gate prices.

Drought years tend to increase domestic demand for lupin, which can push prices above those achieved in export markets.

Pulse Australia maintains a list of pulse traders who deal in export and domestic markets. Smaller buyers and traders can be found in local networks.

Pulse Australia recommends growers consider the following factors when making lupin marketing decisions:

- » Estimates of domestic lupin production
- » Estimates of domestic availability, type and quality of protein feeds (including green pasture)
- » On-farm storage capacity to enable marketing across the year
- » World price and availability of soybean meal
- » Demand for on-farm use by graziers as a fodder grain (especially in droughts).

(More information about grain marketing is contained in Chapter 13.)

MORE INFORMATION

Pulse Australia 'Pulse Traders':
<http://pulseaus.com.au/marketing/pulse-traders>

⁴ Pulse Australia Australian Pulse Crop Forecast (June, 2016): http://www.pulseaus.com.au/storage/app/media/industry/20160613_AU-pulse-crop-forecast.pdf



MORE INFORMATION

Lupin Foods Australia:
<http://www.lupinfoods.com.au/>

DPIRD 'Lupin Markets': <https://www.agric.wa.gov.au/grains-research-development/western-australian-lupin-industry>

11.4 Human consumption markets

Lupin grain has a unique combination of high protein, high fibre, low oil and virtually no starch.

Less than 4 percent of global lupin production is consumed as human food, but it is estimated about 500,000 t of food containing lupin ingredients is consumed each year in the European Union alone.⁵

This is mainly through inclusion of low rates of lupin flour in wheat-based bakery products.

Research has found that consuming foods enriched with flour or flakes from Australian narrow leafed lupin can provide a feeling of fullness, resulting in people eating less and consuming fewer kilojoules.⁶

Other potential health benefits of eating lupin include a more balanced blood glucose level, lower cholesterol and improved bowel health.

Lupin-enriched foods have the potential to provide additional health benefits, including:

- » Better satiety (appetite suppression) and energy balance
- » Glycemic control – reduced blood glucose and insulin response
- » Improved blood lipids
- » Provision of soluble fibre
- » Lowering of total cholesterol
- » No adverse effect on high-density lipoprotein (HDL) cholesterol.⁷

Several Australian companies process lupin grain to flour and flakes for human food consumption.

It is advised that any expansion of domestic processing capacity could boost the potential for Australian lupin to be used in the large Indonesian tempeh market (in place of soybeans).

This could help to increase lupin prices and stimulate increased production of this grain legume across southern Australia.

MORE INFORMATION

EziGrain 'Lupins Receival Standards for 2016-17': <http://ezigrain.abb.com.au/receivalstandards/charts1617/Original%20Lupins%20Receival%20Standards%202016%202017%201288%20R1.pdf>

Pulse Australia 'Australian Pulse Standards 2016-17': http://pulseaus.com.au/storage/app/media/markets/20160801_Pulse-Standards.pdf

11.5 Grain specifications

Pulse Australia, in consultation with the Australian pulse industry, compiles standards for all pulse grains to ensure the best quality is provided to customers on world markets.

Some export markets may have additional specific standards and country quarantine restrictions for weed seeds, disease and contaminant levels. Receival standards in domestic and overseas markets can include (but are not restricted to) limits for defective grain, pod material, phomopsis infection on grain, presence of other diseases or pests, foreign material and/or foreign weed seeds/material.

Compliance with these guidelines is typically the responsibility of individual commodity traders and information is communicated to growers directly.

Prices for lupin have been relatively high in recent years, based on strong domestic demand.

The majority of the eastern states' lupin grain production is sold into the local domestic market and often there have been price advantages from storing lupin on-farm or in a warehouse facility to market after harvest.

5 Pulse Australia Australian Pulse Crop Forecast (June, 2016); http://www.pulseaus.com.au/storage/app/media/industry/20160613_AU_pulse-crop-forecast.pdf

6 Regina Belski (2011) A little lupin improves the bread of life. University of Western Australia, <http://www.news.uwa.edu.au/201106133641/research/little-lupin-improves-bread-life>

7 Regina Belski (2011) A little lupin improves the bread of life. University of Western Australia, <http://www.news.uwa.edu.au/201106133641/research/little-lupin-improves-bread-life>

FEEDBACK

The Pulse Australia ‘Australian Pulse Standards 2016-17’ publication lists a range of domestic and export market receival standards and defect classifications for lupin grain.

These standards cover aspects such as seed purity, moisture, mould, colour, foreign material and snails and apply to all species of lupins (and other pulses), unless specified.

Details can be found at these links: http://pulseaus.com.au/storage/app/media/markets/20160801_Pulse-Standards.pdf or <http://ezigrain.abb.com.au/receivalstandards/charts1617/Original%20Lupins%20Receival%20Standards%202016%202017%201288%20R1.pdf>

These examples of PA receival (delivery) standards for narrow leafed *Angustifolius* lupin are shown in Table 1 and Table 2.

Table 1: Lupin – *Angustifolius* minimum receival standards farmer dressed.

Parameter	Requirements	Comments / Variations
Physical Characteristics	The <i>Angustifolius</i> lupin shall be of the current season and be dry and mature.	
Purity	97% Min by weight	Whole <i>Angustifolius</i> lupin, defective <i>Angustifolius</i> lupin and seed coats.
Moisture	14% Max	----
Defective	7% Max by weight including Max 36 per 200g Poor Colour seeds, Max 2 per 200g Bitter Dark Seeded lupin, 17 Max per 200g of Phomopsis Affected seeds	<i>Angustifolius</i> lupin not of the specified type. <i>Angustifolius</i> lupin that are broken, chipped, diseased, frost damaged, insect damaged, sappy, shrivelled, split, sprouted, weather damaged, wrinkled. Includes pods that contain <i>Angustifolius</i> lupin, whether broken or unbroken, loose seed coats, poor colour, bitter dark seeded lupin and Phomopsis affected.
Mould	1 grain Max per 200g	Mould (Field and / or Storage), Caked, Bin Burnt & Heat Damaged.
Poor Colour	Max 36 seeds per 200g	Yellow reddish / tan coloured lupin as per the GTA Visual Recognition Standards Guide.
Foreign Material	3% Max by weight, includes 2% Max by weight wild radish and 0.5% Max by weight Unmillable Material	Unmillable material and all vegetable matter other than <i>Angustifolius</i> lupin seed material. Includes tolerance for wild radish.
Unmillable Material	0.5% Max by weight (of which 0.3% Max by weight of soil)	Soil, stones and non-vegetable matter. Please read important note re soil contamination – see Point 14 of Procedures.
Snails	One (1) Max	Dead or alive. Whole or substantially whole (more than half) including bodies per 200g sample.
Field Insects	Fifteen (15) Max	Dead or alive per 200g sample.
Grasshoppers & Locusts	Two (2) Max	Dead or alive per 200g sample.
Foreign Seeds	----	
Objectionable Material	Nil tolerance	Includes Objectionable Odour.
Ryegrass Ergot	Two (2) cms Max	Pieces laid end to end per 200g sample.

(SOURCE: Pulse Australia, 2016, http://pulseaus.com.au/storage/app/media/markets/20160801_Pulse-Standards.pdf)

Table 2: Lupin – *Angustifolius* minimum receival standards farmer dressed.

Receival standards					
Narrow leafed, farmer dressed lupin					
Maximum moisture content	Minimum purity	Maximum defective#	Screen size for defective	Poor colour maximum	Foreign material maximum in total
14%	97%	7%	-	-	3%
Unmillable material maximum	Snails maximum	Nominated seeds maximum (Type 1)	Nominated seeds maximum (Type 2)	Nominated seeds maximum (Type 3)	
0.5%	1 per 200g	Nil per 200g	5 per 200g	5 per 200g	

(SOURCE: W. Hawthorne)

In addition to the specifications covered by the Australian Pulse Standards, due to Victoria remaining anthracnose free, lupin grain entering Victoria from SA must either:

- » Have Primary Industries and Regions SA (PIRSA) documentation proving it is free of anthracnose
- » Be marketed to specific NSW Department of Primary Industries (NSWDPI) approved end-users
- » Be transported by accredited agencies under strict protocols and specific transport routes.

11.5.1 On-farm factors influencing lupin deliveries and marketing

There are a range of agronomic, pest and disease factors that can influence lupin delivery options, marketing strategies and returns to growers.

These include, but are not restricted to, Native budworm (*Helicoverpa punctigera*), Lucerne seed web moth (*Etiella*), snails, Phomopsis stem blight (*Phomopsis leptostromiformis*) and Phomopsis pod blight (*Diaporthe toxica*), weed seed contamination and harvester settings (leading to cracked grain).

Pests

Native budworm (*Helicoverpa punctigera*)

This pest can affect returns at harvest from direct lupin grain weight loss (due to seeds being wholly or partly eaten) or downgraded grain quality. Native budworm can cause unacceptable levels of chewed grain or fungal infections introduced via caterpillar entry into seed pods, especially in albus lupin crops (and other pulses with big grains). The percentage of broken, chewed and defective seed found in grain samples affects the final price of pulse crops, particularly those marketed for human consumption.⁸

Lucerne seed web moth (*Etiella*)

Incidence and abundance of Lucerne seed web moth varies by season and location. Severe infestations can result in a loss of lupin yield and quality at harvest. Moth flights commonly occur in mid to late September and often coincide with early pod development in pulse crops. Larvae burrow into pods within 24 hours of hatching and feed on the pods and seeds, remaining until the entire content has been eaten. Adjacent pods may be webbed together as larvae move between pods. Seeds are typically only partially eaten, often with characteristic pin-hole damage. Damage is difficult to grade out and the resulting unattractive appearance reduces seed quality.⁹

⁸ DPIRD (2017) Management and economic thresholds for native budworm, https://www.agric.wa.gov.au/grains/management-and-economic-thresholds-native-budworm?page=0%2C1#smartpaging_toc_p1_s2_h2

⁹ GRDC-Queensland Government, IPM Guidelines for Grains, <http://ipmguidelinesforgains.com.au/wp-content/uploads/Etiella.pdf>

FEEDBACK

Snails

Snails can not only clog up and damage harvesting machinery, causing delays, but also have potential to contaminate grain. In the 'Farmer Dressed' and 'Export Farmer Dressed' markets, the receival standard is a maximum of one snail per 200 g sample. In the 'Export Machine Dressed' standards, there is a nil tolerance of snails.¹⁰

Disease

Phomopsis stem blight (*Phomopsis leptostromiformis*) and phomopsis pod blight (*Diaporthe toxica*)

This fungal disease can infect all parts of the lupin plant, but is more commonly seen on dry stems at maturity, pods and (in some cases) seed. The fungus produces a toxin that can cause lupinosis in grazing livestock, but also has potential to downgrade grain in the market. On pods, large, irregular reddish-tan lesions appear, often covered with powdery grey mould. Infected seeds either appear normal or are discoloured light yellow to reddish-tan. Web-like grey mould may be seen on the seed coat and inside the seed pod. Small black fungal spots on lupin trash may give the stems a flecked appearance.¹¹

Weed seed contamination

Weed seed tolerances in delivered lupin grain vary between States and Territories under respective legislation. All persons trading pulses are advised to refer to relevant legislation for appropriate Weed Seed Standards to ensure compliance. There is no tolerance of toxic and/or noxious weed seeds that are prohibited by State laws against inclusion in stockfeed. There are standards for small foreign seeds, which are those that are not the pulse being sampled.¹²

Harvester settings

As outlined in Chapter 10, lupin crops should be harvested as soon as they are ripe. If lupin is not harvested within three weeks of maturity, shedding may cause significant yield losses. Losses of 5-40 percent can occur as pods shatter entering the header. Vibration due to cutter bar action, plant on plant, reel on crop impact and poor removal of cut material by the auger all cause shattering and grain loss. Grain loss can be reduced by harvesting in high humidity, at night if necessary, to minimise pod shattering. Avoid reaping in extreme heat. Finger reels are less aggressive than bat reels and cause fewer pod losses. Double acting cutter bars reduce cutter bar vibration losses. Four finger guards with open second fingers also reduce vibrations.¹³

10 Pulse Australia, (1 August 2016) Australian Pulse Standards 2016/17, Lupins, *Angustifolius* minimum receival standards farmer dressed parameter requirements, http://pulseaus.com.au/storage/app/media/markets/20160801_Pulse-Standards.pdf

11 GRDC Grains Legume Handbook, 2008, <https://grdc.com.au/resources-and-publications/all-publications/publications/2008/03/2008-grains-legume-handbook>

12 Pulse Australia, (1 August 2016) Australian Pulse Standards 2016/17, Lupins, *Angustifolius* minimum receival standards farmer dressed parameter requirements, http://pulseaus.com.au/storage/app/media/markets/20160801_Pulse-Standards.pdf

13 GRDC Grains Legume Handbook, 2008, <https://grdc.com.au/resources-and-publications/all-publications/publications/2008/03/2008-grains-legume-handbook>