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JUNE 2018

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GRAINS RESEARCH
& DEVELOPMENT
CORPORATION

LUPIN

SECTION 11

GRAIN MARKETS

OVERVIEW | EXPORT DESTINATIONS | DOMESTIC MARKETS | HUMAN
CONSUMPTION MARKETS | GRAIN SPECIFICATIONS | ON-FARM FACTORS
INFLUENCING LUPIN DELIVERIES AND MARKETING

 MORE INFORMATION

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

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

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 CropForecast': http://pulseaus.com.au/storage/app/media/industry/20160613_AU-pulse-crop-forecast.pdf

AgriFutures Australia (formerly Rural Industries Research & Development Corporation) 'Lupin': <http://www.agrifutures.com.au/farm-diversity/lupin/>

Grain markets

11.1 Overview

The bulk of Western Australia's total annual production of narrow leaved lupin grain is exported, predominantly for use as animal feed, to key markets in the European Union, Japan and Korea.

The remainder is retained on-farm for use as stock feed or planting seed, or traded to domestic buyers.

There has been growing international interest in the use of lupin grain, processed to flour or flakes, for human consumption. This is because it 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.

Pulse Australia data shows that in 2014–15, Australia exported about 250,000 tonnes of lupin grain (November–October) from national production of 565,000 t in 2014 (including about 384,000 t in WA).

This was well down from the decade's peak annual lupin grain exports of about 650,000 t in 2011–12, when total WA production was about 679,000 t and national production was about 901,000 t¹

WA is effectively the only Australian exporter of lupin grain, which generally competes with soybean in the international market for vegetable-based proteins for livestock industries.

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 per tonne in 2014–15. This has correlated with high and low Australian and WA production levels, respectively.²

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

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

Annual average prices for narrow leaved lupin on the domestic market in the past 15 years (Fremantle Free-in-store) have fluctuated from a low of just under \$150/t in 1999 to a high of just under \$350/t in 2015. Estimates for the 2016 crop are about \$320/t.³

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

11.2 Export destinations

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

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

Most of these markets use lupin 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, marketing decisions should factor in Australian seasonal conditions, as these will strongly influence farm gate price.

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).⁴

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/>

Irwin Valley: <https://glutenfreeshop.com.au/irwin-valley-lupin-flour-500g.html>

University of Western Australia
'A little lupin improves the bread of life': <http://www.news.uwa.edu.au/201106133641/research/little-lupin-improves-bread-life>

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 used 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, a lowering of 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 HDL cholesterol.⁷

A lupin grain processing plant was operated in WA until 2016 by Lupin Foods Australia. Its closure has reduced the capacity of lupin processing in this State.

Several other companies process lupin for food or feed in WA and nationally, including Irwin Valley.

It is advised that any expansion of this local capacity could boost the potential for WA lupin grain 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 in WA and across southern Australia.

5 DPIRD website (2016) 'Western Australian lupin industry': <https://www.agric.wa.gov.au/grains-research-development/western-australian-lupin-industry>

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>



i MORE INFORMATION

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/or specific quarantine restrictions regarding weed seeds, disease and contaminant levels.

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

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

In some years, there has been a price advantage from storing lupin on-farm, or in a warehouse facility, to market after harvest.

The Pulse Australia publication 'Australian Pulse Standards 2016-17' 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 lupin (and other pulses), unless specified.

In WA, grain receival standards exist specifically for lupin at receivals and include: standard farmer-dressed; WA farmer-dressed: export standard farmer-dressed; and export standard machine-dressed. Details can be found at this link http://pulseaus.com.au/storage/app/media/markets/20160801_Pulse-Standards.pdf

Farmer-dressed pulses are taken to processor or vendor facilities for classing and storage. Pulses that meet receival standards for human consumption are accepted for delivery and further cleaning and storage.

Pulses that do not meet the minimum receival standards for human consumption may be supplied for export in the farmer-dressed state or may be supplied for stock feed.

Pulses meeting the minimum standards for human consumption undergo a process known as machine dressing that removes most of the impurities and foreign matter that might remain in the produce.

Machine-dressed pulses can be sold directly to the public for consumption. The machine-dressed product may be supplied to distributors for sale domestically or for export, or for further processing, such as sorting, grading, splitting or canning.

11.6 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

⁸ DAFWA (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

FEEDBACK

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. Frass is left in the pod and 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

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 200g 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 are 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

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

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