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GRAINS RESEARCH
& DEVELOPMENT
CORPORATION

FABA BEAN

SECTION A

INTRODUCTION

CROP OVERVIEW | PRODUCTS AND USES | MARKET | FABA BEAN RESEARCH
| KEYWORDS

Introduction

A.1 Crop overview

A.1.1 The role of pulses in farming systems

Pulses have a role in the modern farming system, far greater than the traditional 'nitrogen fixation' and 'disease break'. They are a cash crop in their own right, but also a valuable part of the whole farming system, especially for weed control within crop rotations.

Stubble retention is common for erosion protection and moisture retention, and pulses fit into such systems. Seeding machinery used in no-till or minimum tillage systems can now handle stubble retention, to allow pulse crops to be sown after a cereal.

Diversity of crops in a rotation is important for continuous cropping systems:

- to handle herbicide-resistant weeds or delay the onset of herbicide resistance by varying herbicide options and timings for weed control
- to control disease of all crops in the rotation
- to spread the timing of farm operations
- to spread risks across commodities
- to minimise the impact of increased costs of fertiliser nitrogen (N) and fuel

Crop-topping or 'wick'-wiping of weeds with herbicide in the pulse crop prevents the seed-set of escape weeds in the crop. Desiccation or windrowing may also help.¹

It is usual practice to deep-sow legumes, because they have great ability to emerge from depth (Figure 1). Faba bean seed inoculated with rhizobium (Group F) should be planted into moist soil, and can be planted to 15–20 cm depth.²

¹ GRDC (2008) Grain Legume Handbook. Update 7 February 2008. Grains Research & Development Corporation, <https://grdc.com.au/uploads/documents/index.pdf>

² G Onus. Fababean Growing Program. Landmark Moree.

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Figure 1: *Faba beans have the ability to emerge from deep sowing of up to 20 cm.*

Drew Penberthy, Penagcon

Pulses can be sown in wide rows if required, enabling non-selective weed control between the rows using hooded shields. Sowing the pulse crop between the standing rows of cereal stubble is beneficial and can be done with GPS guidance and auto-steer sowing systems.³ This enables the cereal crop in the following season to be planted down the legume row to separate it from the previous cereal stubble and reduce the crop’s exposure to the crown rot fungus.

Planting faba beans with the cereal stubble standing also helps to protect the seedling faba beans from aphid infestations, which in turn can reduce the incidence of virus in the crop.⁴

A.1.2 About faba bean

Faba bean, *Vicia faba*, is a winter-growing pulse, or food legume crop. It originated in the Middle East in the prehistoric period, and has since been cultivated throughout Europe, North Africa, and Central Asia. It was introduced to China over 2,000 years ago via traders along the Silk Road, to South America in the Columbian period, and more recently to Canada and Australia.

Faba bean was first grown commercially for grain in northern New South Wales in the early 1980s, and is now cultivated in Victoria, New South Wales and Western Australia. Small areas are grown in Tasmania and southern Queensland. It is a cool-season crop in Australia, planted in autumn and harvested in late spring–early summer. Because of its value in livestock nutrition and crop rotation, faba bean will receive greater attention and there will be an increasing export potential for Australian grain.⁵

A.1.3 Growing faba bean

The faba bean plant is tall (it may grow a height of 2 m at maturity under optimum conditions), erect and multi-stemmed from basal branches. Faba bean plants in Australian crops are usually <1.5 m tall. Leaves are compound, having 2–7 leaflets.

MORE INFORMATION

GRDC Update Paper: [Sowing time and variety selection for faba bean in southern NSW](#)

³ GRDC (2008) Grain Legume Handbook. Update 7 February 2008. Grains Research & Development Corporation, <https://www.grdc.com.au/uploads/documents/Index.pdf>

⁴ G Onus. Fababean Growing Program. Landmark Moree.

⁵ P Matthews, H Marcellous (2003) Faba bean. Agfact P4.2.7. 2nd edn. NSW Department of Primary Industries, http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0004/157729/faba-bean-pt1.pdf

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Ground Cover: [Faba bean and lentils expand pulse options](#)

First leaves have only two leaflets, but there are seven in the last formed leaves. It has a well-developed taproot, which bears a profusion of fibrous roots in the top 30 cm of soil. Plants will flower profusely and under cool, moist conditions may flower over a 5–10-week period.

Flowering in early varieties begins from about the 5th to 7th leaf-bearing stem node (joint), and up to the 15th or higher node in late varieties. Flowers are borne in clusters (inflorescences) comprising 3–8 flowers (depending on variety) in the angle between leaf and stem (axil) at each node (Figure 2). Inflorescences form in succession up the stem as each new node is produced, over a period of 6–10 weeks, or at ~15 flowering nodes.



Figure 2: *Faba bean flowering.*

Gordon Cumming, Pulse Australia

Like many legumes, excess flowers are produced and <15% will develop to produce pods.

Honeybees seek nectar from the flowers and in the process pick up pollen, transferring it between plants and causing cross-pollination to occur at rates commonly in the range 25–30%.

Flowering finishes once the maximum average weekly temperatures reach >25°C and/or moisture becomes limited, after which an extra few leaf-bearing nodes are produced.

Pods in a well-grown crop are borne from ~20 cm aboveground to ~30 cm below crop height (Figure 3). Each pod contains 2–6 seeds. As pods mature, they turn black, as do the stems and leaves of the plant eventually.

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Figure 3: *Podded faba bean plant.*

NSW DPI Agfact P4.2.7

Seeds vary in size depending on variety, from large flattened beans (also known as broad beans) through medium sizes to smaller, rounded seeds that are like field peas (Figures 4–7). Varieties with medium-sized seed are the main types grown in Australia, whereas the smaller seeded types are common in Europe.



Figure 4: *Faba bean seeds come in different colours and sizes.*

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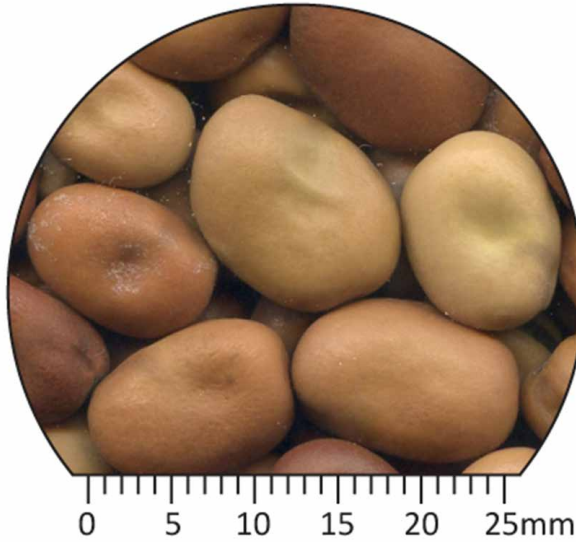


Figure 5: *Faba bean variety Cairo* (released 2004); seed size 55–75 g/100.

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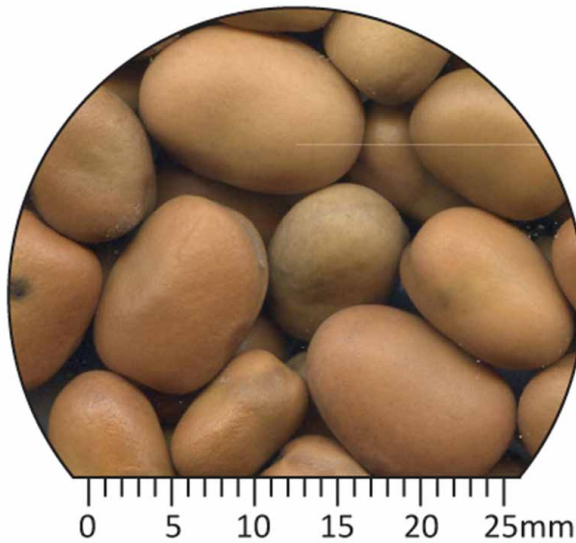


Figure 6: *Faba bean variety Doza* (released 2008); seed size 35–55 g/100.

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[Grain Legume Handbook 2008](#)

SARDI sowing guide: [Faba bean variety sowing guide 2015](#)

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Pulse Australia: [Faba bean production: Northern region](#)

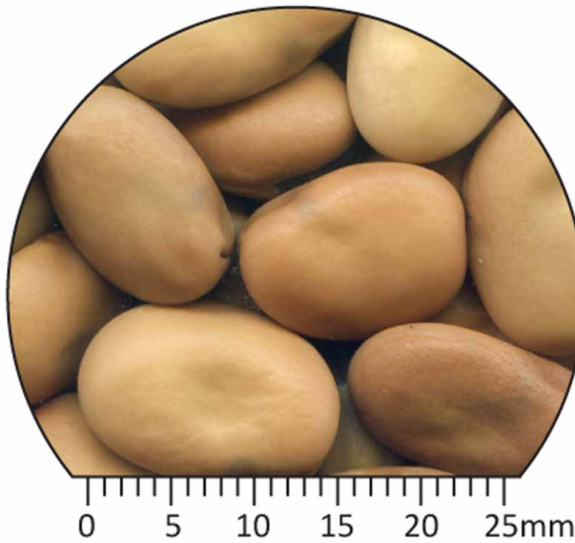


Figure 7: Faba bean variety PBA Warda(b) (released 2012); seed size 55–75 g/100.

Pulse Australia

A.1.4 Suitable environments

Faba beans may be grown over much of the northern grains region, being well suited to the eastern districts where rainfall is higher and spring temperatures are milder than in western areas (Figure 8). Faba beans respond well to irrigation on heavy clay soils.

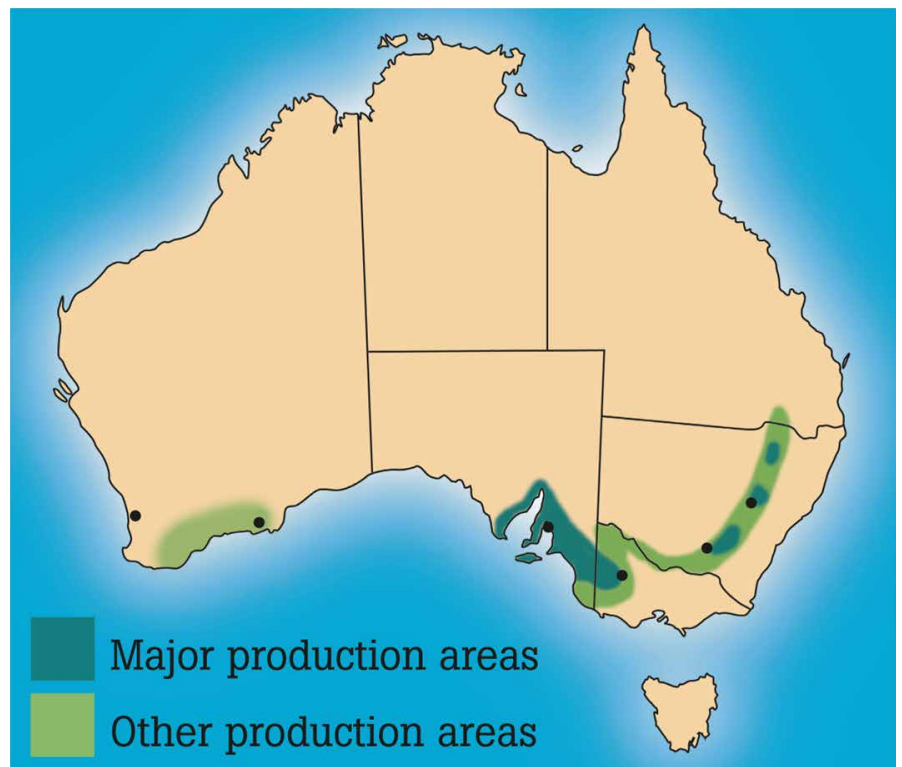


Figure 8: Faba bean production areas in Australia, showing breeding centres.

<http://pulseaus.com.au/growing-pulses/bmp/faba-and-broad-bean>. Image: Pulse Australia

Faba bean plants can tolerate frost during vegetative stages, but severe frosts can deform and lodge stems. Frosts can also cause death of flowers and immature pods

after flowering. The exact temperatures at which damage occurs to flowers and pods are not known. Experience indicates that beans may tolerate temperatures that would normally damage wheat heads in their flowering stage, i.e. below about -4°C . The loss of flowers from frost may be compensated for by pod development at later flowering nodes. Pod development will be adversely affected by hot, dry periods in August and September in northern regions, and during October in the south.

A.2 Products and uses

All seed types are used as dry beans for human consumption or livestock feed. Large-seeded varieties are often used for human consumption as a green vegetable. Value-adding in the form of canning, splitting, and preparation as snack foods services niche markets. In China, faba beans are used to make extruded starch products (vermicelli) and sauces.

Pulses taste good, and are nutritious, versatile and inexpensive. They are in the 'eat most' category of the [Healthy Living Pyramid](#) produced by Nutrition Australia. Pulses are cholesterol-free and most are low in fat (except soybeans and peanuts). The majority of fatty acids in pulses are unsaturated and they comprise both monounsaturated and essential polyunsaturated fatty acids. These unsaturated fatty acids lower the total cholesterol and the harmful LDL (low-density lipoprotein) cholesterol levels in the blood when substituted for saturated fatty acids in the diet.

Pulses are an excellent source of vegetable protein. They are high in minerals such as iron, calcium, magnesium and potassium, and essential trace minerals copper, manganese, molybdenum, selenium and zinc. They also contain essential vitamins such as the B vitamins thiamine, niacin and folate.⁶

Faba bean is sometimes used as a green manure crop, as it is capable of producing a large amount of N-rich biomass.

A.3 Market

World production of faba beans now exceeds 4.0 million tonnes annually, but only about 2% of this production is traded internationally. The major exporting countries are Australia, France, and the United Kingdom. China was a major exporter of faba beans but has recently become an importer. Figure 9 depicts Australian production of faba bean over the past 30 years.

All faba bean grown in Australia is targeted at the human consumption markets. Countries in the Middle East, specifically Egypt, Saudi Arabia, United Arab Emirates are our major buyers of faba bean. Faba bean is generally consumed whole, canned, split and/or milled into flour.

Producing a high-quality product with continuity of supply is important to current and increased access to world faba bean markets.

International trade in food-quality faba beans is dominated by Egypt as the major importer, with several other countries importing smaller but still significant amounts. In addition, several countries are significant importers of faba beans for livestock feed.

The relatively small volume of faba beans traded is insufficient to interest a transparent marketing system such as futures, which is available with other major grain commodities such as corn, wheat and canola.

The price of faba bean as a commodity is quite stable, rising and falling in line with supply and demand. Traditionally, there were stronger markets prior to the Ramadan festive season but this is less relevant today.

The relatively small tonnage traded means that any delay in harvest or shipping in an exporting country can threaten a contract being met, resulting in a 'short' or 'spike' in

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Ground Cover Supplement: [Weigh up the risks, benefits of pulse harvest](#)

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Pulse Australia. 'Australian Pulse Crop Forecast & Market News': <http://www.pulseaus.com.au/marketing/crop-forecast>

the market. These are normally short term and reflect a contractual supply problem rather than a fluctuation in the market.

Recently, the price of faba beans has shown a rising trend as production in the traditional countries has fluctuated for a number of reasons, with insufficient expansion in the exporting countries to fill the demand.

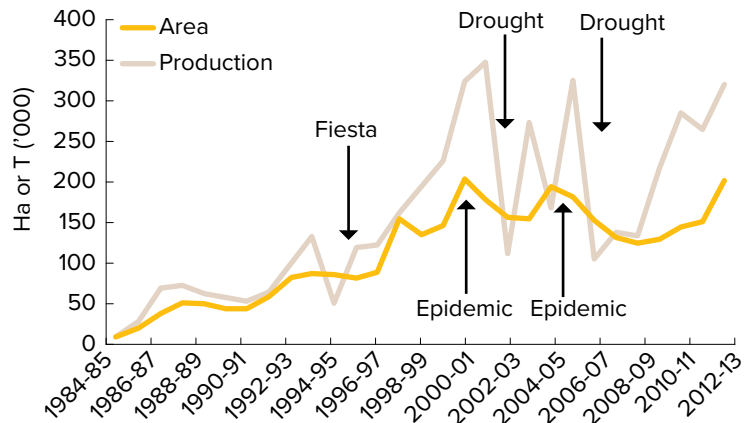


Figure 9: Australian faba bean production by area and tonnage.

J Paull. PBA Faba bean breeding: aims and progress.

Nutritional Information

Faba beans are a good source of carbohydrate and protein and contain a low amount of fats. Starch is the principal carbohydrate component. The crude protein content of faba bean ranges from 24 to 31%.

Faba beans meet adult human requirements for all essential amino acids except methionine and tryptophan. They also provide the recommended daily allowance of all essential minerals, except calcium.

Faba beans are highly digestible and have metabolisable energy value for pigs, poultry and ruminants similar to those of lupin, field pea and soybean meal. ⁷

A.4 Faba bean research

The development of new varieties of faba bean for different regions is a high priority, supported across Australia by the Grains Research and Development Corporation (GRDC) in partnership with New South Wales Department of Primary Industries (NSW DPI), the University of Adelaide and the Australian Centre for International Agricultural Research (ACIAR). Faba bean varieties show a high degree of specific adaptation, which means that different varieties are required for different regions. Generally, improvements in yield and quality arising through improved specific adaptation and increased disease resistance are needed in new varieties.

All varieties released have been developed from genetic material introduced to Australia, mostly from an international genetic resources centre in Syria (the International Center for Agricultural Research in the Dry Areas, or ICARDA), with the best germplasm so far originating from the Mediterranean, southern China and South America.

In northern NSW/Queensland, faba bean improvement is coordinated by NSW DPI, with breeding activities at Narrabri and Tamworth. The aim is to develop faba bean

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Australian Faba Bean Breeding Program: http://finalreports.grdc.com.au/final_reports.php

Pulse Australia: <http://www.pulseaus.com.au/growing-pulses/bmp/faba-and-broad-bean>

<http://grdc.com.au/Research-and-Development/Major-Initiatives/PBA>

varieties suited to subtropical climates with narrower daylength range and earlier springs than southern Australia, and summer-dominant rainfall.

Pulse Breeding Australia (PBA) is a world-class, Australian breeding program for chickpeas, field peas, faba beans, lentils and lupins. PBA has operated since 2006 and its vision is to see pulses expand to >15% of the cropping area, to underpin the productivity, profitability and sustainability of Australian grain-farming systems.

PBA is developing a pipeline of improved varieties for Australian growers that achieve higher yields, have resistance to major diseases and stresses, and have grain qualities that enhance market competitiveness.

PBA is an unincorporated joint venture between:

[Department of Primary Industries, Victoria \(DPI Vic\)](#)

[South Australian Research and Development Institute \(SARDI\)](#)

[Department of Agriculture, Fisheries and Forestry, Queensland \(QDAF Qld\)](#)

[New South Wales Department of Primary Industries \(NSW DPI\)](#)

[Department of Agriculture and Food Western Australia \(DAFWA\)](#)

[University of Adelaide](#)

[University of Sydney](#)

[Pulse Australia](#)

A.5 Keywords

Faba beans, pulse, nitrogen-fixing, crop rotation, northern region.