

The azuki roller coaster

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IN A NUTSHELL

- ▶ Azuki beans are a high value summer pulse crop sold on the export market
- ▶ The crop has quick maturity that allows double cropping with winter crops and therefore a potentially very profitable and flexible rotation
- ▶ There are production and market risks associated with azuki beans that result in a disappointing number of growers losing money every year
- ▶ Key agronomic requirements *must* be met to grow high yielding azuki beans

Australia's ability to produce azuki beans out of season to the northern hemisphere provides a distinct marketing advantage. It also means that production decisions can be made with the knowledge of key market demand prior to sowing.

Japan has been the main market for Australian azuki beans, which are used to make traditional style confectionary. Japan consumes approximately 120,000 tonnes of azuki annually and its domestic production varies from 35,000 to 80,000 tonnes annually. The difference is made up with imports from China, North America, Australia and Argentina. The Japanese government regulates the amount of azuki imported into Japan through a quota system to prevent oversupply and to protect domestic farmers. In addition to the quota, a tariff also applies to imported azuki beans. However, processed azuki paste is not subject to the quota system and has a lower tariff. This has resulted in increasing levels of processed azuki paste being imported into Japan, particularly from China.

More recently Taiwan has become an import market for Australian azuki beans. Taiwan typically imports around 6000 to 8000 tonnes of azuki beans annually. Political issues between Taiwan and China has made Taiwanese buyers look to other countries such as North America and Australia for supply, although a large amount of azuki smuggling still occurs from China. The Taiwanese market is subject to a tonnage limit after which a tariff is introduced. This can see sharp price declines once this tonnage is met. The Australian domestic market is small, only accounting for several hundred tonnes annually.

The quality requirements of the Japanese and Taiwanese markets are similar, although the Japanese are renowned for being more discerning. However, being a high value product, quality and large bean size is important for both markets. The Japanese market prefers a paler coloured bean while the Taiwanese prefer darker beans.

History of azuki in Australia

Azuki beans have been around for a while in Australia, with research work on the crop beginning in the early 1970s. Small areas of commercial azuki production initially occurred in central NSW, NSW north coast and southeast Queensland.

Production of azuki beans became more significant in the early 1990s. The 1993–94 season saw record prices for Australian azuki. This was due to an exceptionally cold year in 1993 in northern Japan that caused very low domestic production. The result was great Japanese demand for imported azuki and very high prices of around \$2000/t to Australian growers. However, Japanese domestic production stabilised in the following year. Combined with an oversupply from exporting countries including Australia, Argentina, North America and China, many Australian



Figure 1 *Australia's ability to produce azuki beans out of season to the northern hemisphere provides a distinct marketing advantage*



growers struggled to sell azuki beans for \$800/t. This incident put many growers off azuki and resulted in the complete demise of the Australian azuki industry until the 1998–99 season. Since then a focus on quality (size and colour) and careful market observation has seen the crop area grow gradually (Table 1).

Traditionally the Lachlan Valley has been the main production area. However, a critical shortage of irrigation water in the Lachlan Valley has seen the MIA become the largest production area with approximately 1000 ha harvested in the 2004–05 season. Table 1 shows harvest area and first grade yields in southern and central NSW over the past seven seasons.

In addition to central and southern NSW, approximately 800 ha of azuki was harvested in northern NSW and southeast Queensland in the 2004–05 season. A similar proportion of the southern and central NSW area (Table 1) has been sown in the northern regions over the last few years.

Azuki profitability

High yields and good prices combine to make azuki beans potentially a very profitable crop. Azuki's quick maturity of about 110–120 days allows double cropping with a winter crop. In this situation an annual rotation that includes azuki beans can potentially produce a gross margin in excess of \$3000/ha. However, the reality of azuki production in Australia is much more sobering. NSW Department of Primary Industries' Azuki check benchmarking results over the last seven years show first grade azuki yields have averaged 1.3 t/ha (Table 1).

First grade yield is beans graded over a 4 mm (10/64") slot screen and usually represents 75–85% of the total yield and about 95% of the total income. The small amount of grade-out product is sold for lower-value human consumption products and into the stock feed markets.

Growing costs of azuki are typically between \$1000 and \$1700/ha. Prices for average to good quality azuki beans have been in the range of \$1100–\$1700/t for the 2004–05 season. Simple maths shows that there is little profitability in growing an average azuki crop of 1.3 t/ha (first grade) in all but the years when prices are very high. However, some growers are regularly achieving first grade yields in the range of 2.0–3.0 t/ha, making for a good gross margin in most years.

Table 1
Recent azuki bean area and first grade yields in southern and central NSW (Macquarie, Lachlan, Murrumbidgee and Murray valleys)

Year	Area harvested (ha)	First grade yield (t/ha)
1998–99	170	1.3
1999–2000	380	1.3
2000–01	620	1.0
2001–02	800	1.4
2002–03	1200	1.1
2003–04	1750	1.3
2004–05	2400	1.4

Considerable experience and expertise has been gained in azuki agronomy in the last few years. Azuki are being grown using innovative techniques, along with very close management. The results have seen record yields (3.2 t/ha first grade in 2004–05 season) and the number of crops yielding above 2.0 t/ha more prominent. However, a large number of low yielding crops every year continue to pull down the average. Long term Azuki check figures show that on average 20–30% of growers lose money (ie show a negative gross margin) every year.

Growing high yielding azuki crops

High yields are the key to profitable azuki bean production. Detailed agronomic management is provided in the NSW DPI Irrigated Azuki Agnote. The following points represent some of the key aspects of growing high yielding azuki.

Soil type

Azuki require well drained soils for high yields. Alluvial silty loams and sandy loams that grow good lucerne are ideal. Azuki will grow on heavier clay soils, but often appear stunted and fail to yield well. Azuki appear to be particularly sensitive to subsoil sodicity. The lure of high prices has seen many azuki crops grown on less than ideal soils and this has been one of the most obvious causes of poor crop performance. Soybeans are suggested as being a better option on heavier clay soils.

Irrigation management

Azuki require careful irrigation management. They are very sensitive to moisture stress particularly in the early to mid flowering period. Moisture stress during this time will see flowers aborted. This not only reduces yield but the plant will usually try to re-flower, producing mixed grain colour at harvest and delayed maturity.

At the other end of the moisture scale azuki are quite sensitive to waterlogging. Waterlogging reduces rhizobium function and crop growth. Correct soil selection and a soil moisture monitoring system will help reduce waterlogging.



Figure 2 First grade yield is beans graded over a 4 mm (10/64") slot screen and usually represents 75–85% of the total yield and about 95% of the total income



Azuki have performed most reliably under pivot irrigation systems. Poor water infiltration on the outside edges of areas under large pivots can be a problem. Double cropping into standing wheat stubble helps to reduce this effect.

Azuki performance on flood irrigation systems has been variable. Performance on bed systems has been disappointing but this is thought to be partially related to heavier soil types and subsoil sodicity. Azuki have performed well on border check when grown on lighter soil types.

Long term Azuki check figures indicate an average water use of 5–7 ML/ha for pivot irrigation systems and 6–8 ML/ha for flood systems.

Sowing

Sowing dates are set so that the crops mature in a temperature range that promotes large bean size and good colour. Suggested sowing dates vary depending on the location but are generally between mid December and early January in central and southern NSW. Earlier sowing dates than suggested will reduce grain size and result in a darker seed. With the strength of the Taiwanese market in recent years some growers are sowing earlier to target this market. Market demand needs to be taken into account when deciding on sowing dates for this strategy to pay off.

Plant populations in the range of 60–70 plants/m² provide the best competition with weeds and the most reliable yields. Lower populations may have a place in cooler areas or where sclerotinia pressure is expected to be high.

Crop nutrition

Azuki have similar nutritional requirements to other summer pulse crops. As a pulse crop, they will normally respond to inoculation with *Rhizobium* bacteria. However, achieving good nodulation early in the crop's development has proven difficult. Azuki generally nodulate better when grown in paddocks with a history of azuki and this has led to higher yields. Post sowing applications of nitrogen are being used to promote growth when nodulation appears inadequate.

Weed control

Azuki compete poorly with weeds in the establishment stage of the crop. A range of herbicides is available that can control most problem weeds in azuki. Milk thistle (*Sonchus oleraceus* L) is one the biggest problem weeds, particularly in country with a history of azuki. Dual Gold® has recently been permitted in NSW for milk thistle control in azuki.

Insect control

Azuki are susceptible to a range of insects, similar to most summer pulse crops. However, being a high value crop the thresholds are lower and insect monitoring needs to be intense. The biological products BT (*Bacillus thuringiensis*) commercially available as Dipel® and NPV (nucleopolyhedrosis virus) commercially available as ViVus® have recently been approved for use on azuki and play an important role in insect IPM (integrated pest management), helping to encourage beneficial predatory insect and reduce reliance on synthetic chemistry.


Disease control

Sclerotinia (*Sclerotinia sclerotiorum*) is a persistent problem in high yielding azuki crops and can cause large losses if not controlled. Good azuki yields are generated from large crop biomass and this creates conditions that are rife for sclerotinia. Experience has shown the disease is often just as bad in first year crops as it is in old azuki paddocks. The disease is particularly bad in the more eastern areas where a greater density of broadleaf weeds and crops that host sclerotinia exist. Timely applications of fungicide are required for controlling sclerotinia in azuki. Wide rows, lower plant densities and sowing row orientation may help to reduce disease potential.

Harvest

Defoliating with Roundup® MAX at 80% pod brown usually works well, allowing thorough crop and weed dry down. Azuki stems are very ropy and can be difficult to harvest if not allowed to dry down. Quality assurance is an important aspect of growing azuki beans. Traceability is important for export markets. Contamination with similar sized crop seeds, weeds and other foreign material can cause large grade-outs and market rejection.

Industry development

The NSW Dry Bean Growers Association (NSWDBGGA) is a grower driven group formed in 2000 to support minor dry bean crops such as azuki. It liaises closely with the NSW DPI and Pulse Australia to ensure that a relatively small industry like azuki beans doesn't "fall through the gaps" in terms of crop support. The group is very active in central and southern NSW holding several field days and seminars throughout the year. It also has a research and development program that involves trialling new products and growing techniques. Azuki bean is not a compulsory GRDC leviable crop. As such, grower members contribute crop levies which are used to run the association and its R&D program to ensure azuki beans remain a viable crop option into the future. 

Further information

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