PULSE VMP
Pulse Variety Management Package

Opal-AU$^{\phi}$

Large seeded shiny green mungbean

High yielding variety with improved foliar disease protection

MAIN ADVANTAGES

Opal-AU$^{\phi}$ is a significant step forward in foliar disease resistance for the Australian mungbean industry. It offers the best available package of protection from the seedborne bacterial disease halo blight and from the fungal disease powdery mildew. Opal-AU$^{\phi}$ complements existing varieties in terms of yield, regional adaptation and suitability for export markets.

For growers on the Eastern Downs and in New South Wales Opal-AU$^{\phi}$ provides improved yield performance and improved resistance to foliar disease over Jade-AU$^{\phi}$. In the Callide-Dawson region Opal-AU$^{\phi}$ has yielded equivalent to Jade-AU$^{\phi}$ and slightly higher than Crystal$^{\phi}$. Opal-AU$^{\phi}$ was lower yielding than Jade-AU$^{\phi}$ at Warra on the Western Downs and also in the Central Highlands.

Opal-AU$^{\phi}$ has good early vigour, strong vegetative growth, an erect plant type and excellent harvestability. It retains green leaf up to physiological maturity and spray-out. Plant type and production agronomy are equivalent to current large-seeded varieties. Grain size of Opal-AU$^{\phi}$ is intermediate between Jade-AU$^{\phi}$ and Berken.

SEED PROTECTION & ROYALTIES

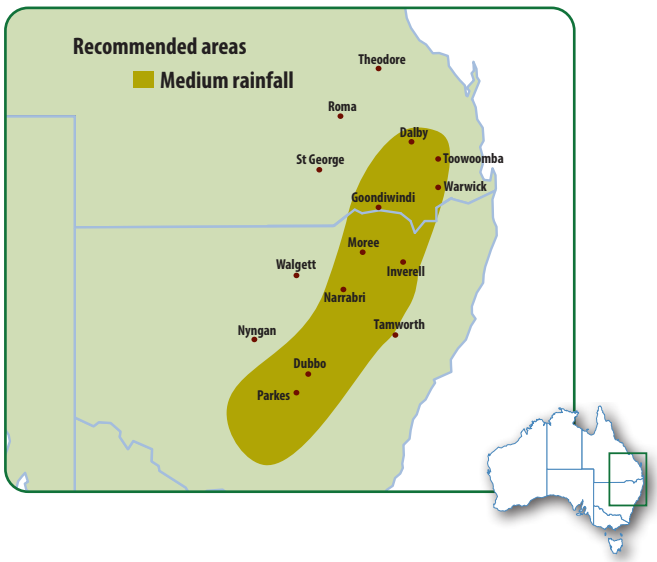
Opal-AU$^{\phi}$ is protected under Plant Breeders' Rights (PBR) legislation. Growers may only retain seed from production of Opal-AU$^{\phi}$ for their own use.

A seed royalty to the breeders currently applies at the point of seed sale. This royalty is re-invested in the National Mungbean Improvement Program to continue to develop higher yielding and more resilient varieties.

KEY FEATURES

- Opal-AU$^{\phi}$ was 12% higher yielding than Jade-AU$^{\phi}$ on the Eastern Downs and in New South Wales across eight years of regional testing
- Rating of moderately resistant (MR) to halo blight (best available protection in a large-seeded mungbean)
- Rating of moderately resistant (MR) to powdery mildew (best available protection)
- Rating of susceptible (S) to tan spot
- Tall, erect plant type that holds its pods high to increase harvestability
- Production agronomy, maturity and marketing equivalent to Crystal and Jade-AU$^{\phi}$

AREA OF ADAPTATION



The release of Opal-AU$^{\phi}$ is supported by rigorous evaluation in 27 yield trials conducted from the Central Highlands to the Liverpool Plains between 2013 and 2020.

GRDC Grains Research & Development Corporation
Queensland Government
Australian Mungbean Association

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Table 1: Long term yield performance of mungbean varieties in north-eastern Australia

Variety	Eastern Downs and NSW# (10)	Callide-Dawson (4)	Western Downs (7)	Central Highlands (6)
Jade-AU$^{\Phi}$ (t/ha)	**1.278**	**1.198**	**1.673**	**1.322**
Opal-AU$^{\Phi}$	112%	101%	93%	88%
Crystal$^{\Phi}$	93%	96%	91%	92%
Berken	not tested	not tested	not tested	not tested
Satin II$^{\Phi}$	94%	91%	89%	93%
*Celera II-AU$^{\Phi}$	89%	52%	57%	43%

Note: table values are averages of data collected from regional evaluation trials conducted 2013–2020.
Jade-AU$^{\Phi}$ is expressed in tonnes per hectare and other varieties as a percentage of Jade-AU$^{\Phi}$. Columns represent key production environments, figures in brackets are the number of trials completed in each region.
NSW trials were on Liverpool Plains and at North Star.
* Breeding trials are managed for a Crystal$^{\Phi}$/Jade-AU$^{\Phi}$ maturity type and this causes the early maturing variety Celera II-AU$^{\Phi}$ to suffer yield loss in Western Downs and CQ trials.
Source: National Mungbean Improvement Program.

YIELD AND ADAPTATION

Opal-AU$^{\Phi}$ is the highest yielding mungbean variety for the Eastern Downs and New South Wales (see table 1) where its yield potential and improved resistance to halo blight and powdery mildew make it best matched to these growing environments and their predominant disease risks.

In districts with higher temperatures and where halo blight is less prevalent variety selection should be informed by yield performance and disease reactions. Opal-AU$^{\Phi}$ yield has been intermediate between that of Jade-AU$^{\Phi}$ and Crystal$^{\Phi}$ in trials at Warra. For the Central Highlands, Jade-AU$^{\Phi}$ is the variety of choice since it has been consistently higher yielding than Opal-AU$^{\Phi}$.

DISEASE MANAGEMENT

Halo blight, powdery mildew and tan spot are the key foliar diseases that impact mungbean production in north-eastern Australia (see table 2). Opal-AU$^{\Phi}$ offers the best protection from halo blight and powdery mildew.

The bacterial diseases halo blight and tan spot are an insidious threat to the mungbean industry. They survive in the seed of infected crops, in crop stubble and on a range of alternative weed hosts. Both of these diseases are caused by bacteria and as such foliar fungicide sprays are of no benefit. There are no effective in crop management options. Both bacterial diseases can cause significant yield losses. However, there are control options for the fungal disease powdery mildew, see www.mungbean.org.au for current information on registered products. Powdery mildew can be prevalent in early sown spring crops where it impacts vegetative growth, or in the autumn where widespread infection of leaves will reduce the efficacy of desiccation. Opal-AU$^{\Phi}$ has:

- the best protection from halo blight among large seeded varieties
- the best protection from powdery mildew of all Australian varieties
- susceptibility to tan spot.

Table 2: Disease reactions of mungbean varieties in north-eastern Australia

Variety	Market type	Halo blight (4)	Powdery mildew (5)	Tan spot (3)
Opal-AU$^{\Phi}$	**Large shiny**	**MR**	**MR**	**S**
Jade-AU$^{\Phi}$	Large shiny	MS	MS	MS
Crystal$^{\Phi}$	Large shiny	MS	MS	MS
Berken	Large shiny	S	VS	VS
Satin II$^{\Phi}$	Large dull	MS	MS	MS
Celera II-AU$^{\Phi}$	Small shiny	MR	MS	MS

Data from field disease experiments conducted 2014–2020.
S = Susceptible, MS = Moderately Susceptible, MR = Moderately Resistance, R = Resistant
Figures in brackets are the number of experiments completed for each disease.
Source: National Mungbean Improvement Program.

Employ the services of an Accredited Mungbean Agronomist

A list of Accredited Mungbean Agronomists can be found on the AMA website www.mungbean.org.au

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Due to the nature of bacterial diseases there is currently no scientific data to indicate economic losses in grain yield.

To reduce production risks, the best practice guidelines are:

i. sow resistant varieties,
ii. source clean planting seed, and
iii. allow two summer fallows between sowing mungbean in the same paddock.

Leaf samples typifying halo blight disease reaction of Jade-AU$^{\Phi}$ (left hand side) and Opal-AU$^{\Phi}$ (right hand side) in artificially inoculated halo blight field experiments.

AGRONOMIC MANAGEMENT

Opal-AU$^{\Phi}$ has equivalent time to flowering, time to maturity and harvestability to current large seeded varieties (see table 3). Agronomic performance and management guidelines for Opal-AU$^{\Phi}$ are equivalent to those established for Crystal$^{\Phi}$ and Jade-AU$^{\Phi}$. Of the 27 trials summarised in this Variety Management Package, six trials were conducted with supplementary irrigation and yielded between 1.5 and 2.0 tonnes per hectare.

SEED QUALITY

Current industry best practice is for growers to replace their planting seed every three seasons to ensure that the seed is genetically pure, of the highest vigour and has minimal risk of infection from the seedborne diseases halo blight and tan spot. Growers should conduct a germination test and seed count to calculate sowing rates and target establishment of 20 plants per square metre (dryland).

AMA APPROVED SEED

Only buy seed that is clearly labelled as AMA Approved Seed. This seed has been harvested from dedicated seed crops that have been inspected to ensure varietal integrity and to minimise the risk of seedborne infection from the bacterial diseases halo blight and tan spot.

Opal-AU$^{\Phi}$ is available from your local AMA member or seed reseller.

VARIETAL INTEGRITY

Varietal purity is essential as mixtures are unacceptable in the marketplace and mixed seed lines can often lead to heavy discounts.

Table 3: Agronomic traits of mungbean varieties in north-eastern Australia

Variety	Maturity group	Time to flowering (days)	Time to maturity (days)	Plant height (cm)	Standability (score)	Shattering resistance (score)
Opal-AU$^{\Phi}$	**medium**	**40**	**72**	**59**	**3**	**2**
Jade-AU$^{\Phi}$	medium	41	70	54	3	2
Crystal$^{\Phi}$	medium	41	74	57	2	2
Berken	medium–early	41	71	48	3	2
Satin II$^{\Phi}$	medium	42	71	54	2	2
Celera II-AU$^{\Phi}$	early	39	68	50	2	4

Data from regional yield trials conducted 2013–2020.
Scores are recorded 1-9, and 1 is always the most desirable score. As follows:
Standability 1 = fully erect, 9 = flat on the ground
Shattering resistance 1 = no loss of yield, 9 = complete yield loss
Source: National Mungbean Improvement Program.

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MARKETING

Opal-AU$^{\phi}$ will suit the large green shiny mungbean market for domestic and export buyers. Opal-AU$^{\phi}$ should be segregated from Crystal$^{\phi}$ and Jade-AU$^{\phi}$, because its grain is slightly more spherical in shape and its grain size is intermediate between these varieties and Berken.

Opal-AU$^{\phi}$ Jade-AU$^{\phi}$

BREEDING

The National Mungbean Improvement Program is led by the Department of Agriculture and Fisheries (DAF) in Queensland, with investment by the Queensland Government and the Grains Research and Development Corporation (GRDC). Opal-AU$^{\phi}$ was developed at DAF's Hermitage Research Facility in Warwick and was released under exclusive licence to the Australian Mungbean Association in 2020.

ENQUIRIES

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