PULSE VMP
Pulse Variety Management Package

CRYSTAL$^{\Phi}$

Large-seeded Bright Green Mungbean

Australian grown mungbeans have quality written all over them!

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GRDC Grains Research & Development Corporation

Queensland Government

PULSE AUSTRALIA

NSW Industry & Investment

CSIRO

KEY FEATURES

- Crystal$^{\Phi}$ is a new variety of large-seeded, bright green mungbean.
- Crystal has the best available combined suite of resistance to Powdery Mildew, Tan Spot and Halo Blight among current varieties.
- Crystal out yields all current varieties:
  - Emerald by 20% and White Gold by 4% in DPI&F replicated trials
- Crystal has superior grain quality characteristics compared with current varieties.
  - In five years of evaluation trials, Crystal has demonstrated the most robust grain quality and colour over a wide range of seasonal conditions
- Crystal is broadly adapted, suitable for all mungbean production areas and offers a strong agronomic package.
- Crystal is well suited to high yielding situations where lodging can be a major constraint to yield such as in irrigated crops.
- Crystal holds its pods high on the bush helping to increase harvestability.

Varietal Description

Crystal$^{\Phi}$ is a large-seeded bright green mungbean, released by the National Mungbean Improvement Program, led by Queensland Department of Primary Industried and Fisheries (DPI&F). It has been released under licence to the Australian Mungbean Association (AMA) for commercialization and is subject to PBR. Crystal$^{\Phi}$ is a cross between White Gold^{TM}, Emerald$^{\Phi}$ and CPI 109897, initially conducted by CSIRO.

Crystal is a very consistent performer in all regions, with up to 20% higher yield than Emerald and 4% higher yield than White Gold. Crystal provides superior seed quality compared to other commercial varieties under both dryland and irrigated production. Crystal has been extensively tested by DPI&F and NSW DPI in 35 regional yield trials between 2003 and 2007

Crystal offers significant advantages in grain quality. Across all trial sites Crystal, showed superior evenness of colour. Its colour, brightness and shape was more robust across a range of seasonal constraints compared to current commercial varieties.

Crystal is a relatively tall, erect variety with similar lodging resistance to Emerald. Crystal has the best available combined suite of resistance to Powdery Mildew (rating MR) similar to Emerald, Tan Spot (rating MR) similar to Celera and Halo Blight (rating MS) similar to Emerald. Crystal has low levels of hard seed increasing its attractiveness to both the cooking and processing markets.

Crystal has widespread adaptation to a range of planting times and is suitable for both "spring plantings" (Sept/Early Oct) due to its weathering ability and "conventional summer plantings" (Dec/Jan) due to its level of Powdery Mildew resistance.

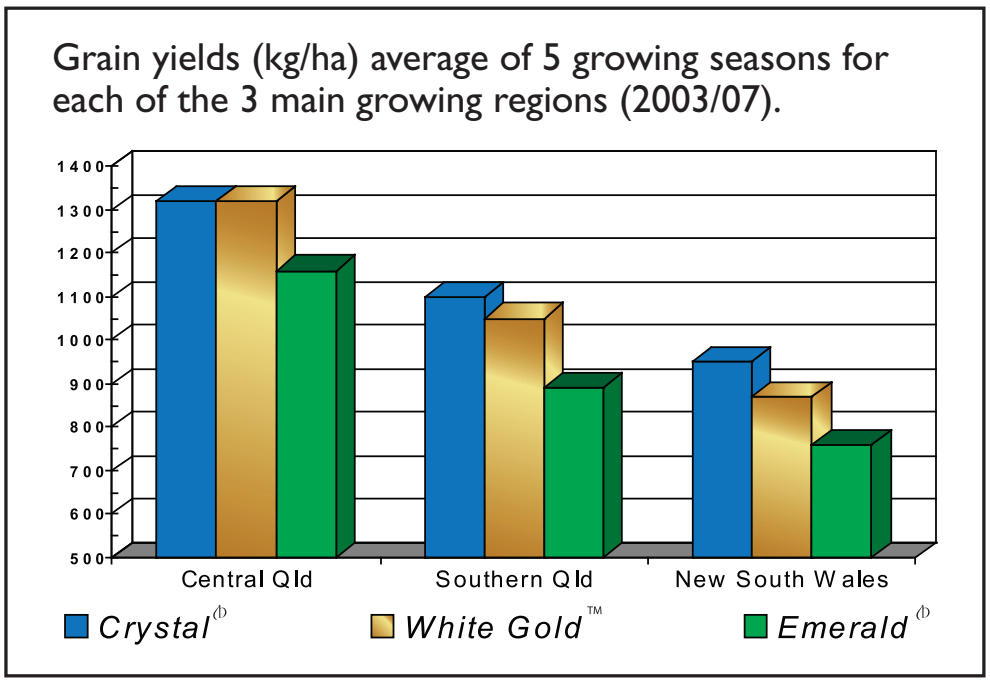
Production agronomy is equivalent to current varieties. Best Management Practice for Mungbean is the use of AMA Approved Seed and growing your crop along with the services of a Certified Mungbean Agronomist, a list of which can be found at **www.mungbean.org.au**

Commercial planting seed is available for purchase from your AMA approved seed producer or local seed reseller.

Yield and Adaptation

Crystal is widely adapted to both dryland and irrigated production systems across all the main production areas in both Queensland and New South Wales.

The growth habit of Crystal is similar to that of Emerald and White Gold, maturing in the same number of days and with equivalent plant height and standability. Crystal is well suited to high yielding situations where lodging can be a major constraint to yield such as in irrigated crops. Crystal holds its pods high on the bush helping to increase harvestability.



Crystal has been extensively evaluated by both the DPI&F and NSW DPI and has demonstrated a distinct yield advantage over all other commercially available varieties.

Crystal is 20% higher yielding than Emerald and 4% higher yielding than White Gold across replicated field trials conducted by DPI&F and NSW DPI between 2003 and 2007.

Crystal has performed consistently across 35 sites including spring and summer plantings, dryland and irrigated trials from central Queensland to Central New South Wales.

Grain quality

Crystal offers significant advances in terms of grain quality. In five years of field evaluation trials conducted by the DPI&F, over a wide range of seasonal conditions Crystal demonstrated the most robust grain quality characteristics of the current available varieties showing superior evenness of seed colour, brightness and shape.

Crystal will be suitable for sale into the Cooking and Processing grades.

'Crystal(Φ)'

'Emerald(Φ)'

Grown at Hermitage Research Station 2006/07.

Disease Reaction

Crystal has the best available combined suite of resistance to Powdery Mildew, Tan Spot and Halo Blight and is the preferred variety for late plantings sown after the end of December.

While mildew is slower to develop on Crystal, applications of Headland Sulphur may be warranted as it can still be quite damaging especially if it occurs prior to, or at flowering.

In DPI&F field trials Crystal[(1)] has the best available suite of disease resistances among current varieties.

Description	Tan Spot	Powdery Mildew	Halo Blight
Resistant			
Moderately Resistant	Celera, **Crystal**		
	White Gold	Celera, **Crystal**, Emerald	Regur
Moderately Susceptible		Green Diamond, White Gold	White Gold
	Delta, Emerald, Green Diamond	Delta	**Crystal**, Delta, Emerald, Green Diamond, Satin
Susceptible			Berken
	Berken, Satin	Berken, Satin	Celera
Very Susceptible			

New GRDC national disease resistance rating scale.

Tan spot (also called bacterial scorch and wilt) is caused by *Curtobacterium flaccumfaciens pv. flaccumfaciens, (Cff),* whilst halo blight is caused by *Pseudomonas savastanoi pv. phaseolicola (Psp).*

Both bacteria survive from season to season mainly on, or in, infected seed, but they can also carry-over on weeds such as bellvine, cowvine and morning glory, and volunteer plants of mungbean and other hosts such as soybean and navybean. Infected crop residues (leaves and pods) can also harbour the bacteria, but survival on such residues is limited.

Growers should not keep planting seed from crops that have displayed symptoms of these bacterial diseases. Use seed that is labelled as having been through the Australian Mungbean Association approved seed scheme, because this seed is sourced from crops which have been inspected and found to be free of these major diseases.

Agronomic Management

Production agronomy is equivalent to current varieties.

Target plant populations are; **25 plants/m² for dryland and at least 30 plants/m² for irrigated crops.**

Due to the large variation in seed size between varieties seeding rates need to be calculated for each variety separately.

The growth habit of Crystal is similar to that of Emerald and White Gold, maturing in the same number of days and with equivalent plant height and standability. Crystal is well suited to high yielding situations where lodging can be a major constraint to yield such as in irrigated crops. Crystal holds its pods high on the bush helping to increase harvestability.

Planting times

Crystal has widespread adaptation to a range of planting times and is suitable for both "spring plantings" (Sept/early Oct) due to its weathering ability and "conventional summer plantings" (Dec/Jan) due to its level of Powdery Mildew resistance.

The most consistent results with spring plantings have been achieved with late September/early October plantings in situations with at least 90 cm of stored soil water.

Late October/November plantings are considered a riskier proposition because of the increased risk of experiencing dry, heatwave conditions on the emerging seedlings and of plants at flowering.

The key to a successful mungbean crop is;

- Planning with your local packer/marketer, prior to sowing to determine likely market demands and requirements.
- Paddock selection, based on soil type, topography and the amount of plant available water (PAW).
- Establishing the optimum plant population, using quality, tested seed & sound inoculation procedures.
- Timely insect control, scout for mirids early in the crop from before budding which can be as quick as 25 days.
- Effective harvest management, including crop desiccation when 85% of pods are brown, to ensure timeliness of harvest and maximum grain quality.

Best management practice guidelines are to use AMA Approved Seed and to employ the services of a Certified Mungbean Agronomist.

Seed Commercialisation

Crystal(Φ) is protected by PBR under the ***Plant Breeders Rights Act 1994***. Seed is commercialised by the Australian Mungbean Association and is available from your AMA approved seed producer or local seed reseller, a listing of which can be found at **www.mungbean.org.au**

Growers can retain seed from production of Crystal for their own planting seed use.

Current industry best practice is for growers to replace their planting seed every 3 seasons to ensure that the seed is genetically pure, of the highest vigour and free from the seed-borne diseases Tan Spot and Halo Blight. These bacterial diseases are seed-borne and can significantly reduce yields.

Seed quality/varietal purity

Varietal purity is essential, as mixtures are unacceptable in both the sprouting, cooking and processing trade. Mixed seed lines will often attract heavy discounts purely on their visual appearance.This particularly applies to contamination with varieties like Satin, with its dull seed coat giving the appearance of weather damage in the sample.

When purchasing seed, growers should make sure it is from a reputable source - preferably one where it has been either inspected or tested for varietal purity, such as AMA Approved Seed.

The quality of seed retained on-farm can deteriorate over a period of two to three seasons due to genetic drift. These seed samples often look uneven and may have a large proportion of dull blue-green seeds mixed with shiny seeds.

Planting seed should be replaced every two to three production seasons. DPI&F trials have shown reduced emergence in grower-kept and older seed stocks as compared to seed from the AMA Approved Seed Scheme.

Only purchase seed that is clearly labelled and has been harvested from crops inspected for diseases. Such as Australian Mungbean Association Approved Seed.

Further Information

Additional publications that are available from the AMA website or your local AMA representative include;

- Listing of current Mungbean Certified Agronomists
- Mungbean Management Guide.
- Profitable Mungbean Production – A checklist for growers.
- Mungbean pest management.
- Mungbean Grower Declaration Form.

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