

# Pulse Quality and Delivery Standards 2021

Phil Bowden (NSW) & Paul McIntosh (Qld) | Pulse Australia Agronomists



# Agenda



- Global market update
- What pulse markets want
- What the Australian pulse industry delivers
- How pulse standards are determined
- Current pulse standards
- How you can achieve high pulse grain quality
- How you can retain high pulse grain quality
- Future developments
- Grain Trading courses
- Survey

# What's going on in the global market

- Pulse total global production around 60 to 70 million tonnes.
- India produces 12 to 18 million tonnes of pulses a year and consumes 16 to 17 million. Tariffs have affected trade for several years.
- Turkey, Italy, Russia, Ukraine, Eastern Africa compete in market.
- Canada and Australia are generally the biggest exporters.
- Canada produces up to 5 million tonnes a year mostly lentils and peas (drought conditions 2021).
- Australia can produce around 4.5 million tonnes (2016).
- In 2020 Australia produced 3.0 million tonnes chickpeas, lentils, faba beans, mung beans, peas, lupins.



# End Use for Pulses

- Whole Pulses

- Soups
- Sauces
- Dips, Spreads
- Ready to eat foods



- Pulse Flours & Fractions

- Batter & bread
- Bakery
- Beverages
- Plant “meats”, analogues
- Snack foods



# Customer Needs

- Visual market for most pulses
- Assess both seed coat and the kernel (in the split product)
- Food safety (<MRL for chemicals, contaminants)
- Minimum defective grain (diseased, damaged)
- High purity (no weed seeds, gumnuts, soil)
- Size (even)
- Shape (round, football)
- Colour (even, pale/light)

# Pulse Australia Charter



- Distinguish Australian Pulse products in the international marketplace.
- Develop and maintain existing and new markets.
- Address any weak links in the pulse value chain.
- Provide coordinated leadership and planning.
- Encourage world's best practice throughout the whole industry.
- Foster and maintain grower confidence.
- Ensure a reliable production base of consistent and safe pulse crops that meet customer requirements.

# The Pulse Standards Committee



- Represents technical interests of pulse industry.
- Develops Receival and Out-turn Standards for all grain types in the pulse industry.
- Receives input and monitors feedback from various industry sectors (domestic & international).
- Continually reviews and updates Standards to better reflect market requirements annually.
- Ensures Standards reflect DA export requirements and importing country quarantine requirements.
- Industry consultation starts in March, finalised in August each year so farmers have time to prepare for harvest.

# Pulse Standards Committee Members 2021



Name	Organisation	Main Representation				
		Growers	Storage Agents	Processors	Marketers & Exporters	Entire Industry
Sudith Patharana	Australian Grain Exports P/L (SA)		Y		Y	
Zachary Whale	Grain Growers Australia	Y		Y		
Mat Samin	GrainCorp (Qld)		Y		Y	
Nick Goddard	Pulse Australia CEO	Y	Y	Y	Y	Y
Jade Saunders	Viterra (SA/Vic)		Y	Y		
Neil Wandel	Grower/Processor (WA)	Y	Y	Y		
Lachie Seears	Boonderoo Pastoral Grower (SA)	Y				
Sam Holmes	SA Pulse Group (Agronomist)	Y				
Phil Bowden	Pulse Australia (Agronomist, NSW)	Y				
Gerard McMullen	Independent Chair	Y	Y	Y	Y	Y
Summary		7	6	5	4	2























# Grower → Trader Relations

- Growers need to develop a relationship with their traders/buyers to ensure they have a good understanding of what buyers need and are willing to pay.
- Different buyers can have different receival standards depending on their target market specifications.
- Visual standards make the delivery standards subjective.

# Standards Parameters

- Physical characteristics
- Purity
- Moisture
- Defective
- Mould
- Poor colour
- Fungal affected
- Foreign material
- Unmillable material
- Snails
- Field Insects
- Grasshoppers and Locusts
- Foreign seeds
- Objectionable Material
- Ryegrass Ergot

**CSP – 4.1.2 CHICKPEAS – DESI TYPE No. 1 MINIMUM EXPORT  
STANDARD FARMER DRESSED**



PARAMETER	REQUIREMENTS	COMMENTS / VARIATIONS
<b>Physical Characteristics</b>	The Desi type Chickpeas should be sound, dry, fresh and light to medium brown in colour (a greenish tinge of the seed coat is allowed). Black is excluded as the predominating class.	
<b>Purity</b>	97% Min by weight	Whole Desi type Chickpeas, defective Desi type Chickpeas and Desi type Chickpea seed coats.
<b>Moisture</b>	14% Max	----
<b>Defective</b>	Containers (bulk or bagged): 8% Max by weight Bulk vessel hold shipment: 10% Max by weight All include Poor Colour	Desi type chickpeas that are broken, chipped, diseased, frost damaged, green, hail damaged, insect damaged, sappy, shrivelled, split, sprouted, weather damaged, wrinkled. Includes pods that contain Desi type chickpeas, whether broken or unbroken, loose seed coats and all Desi Chickpea seed material falling through the 3.97mm slotted screen - see Point 13 of Procedures.
<b>Of which Severely Damaged</b>	1% by weight*	Mould, Heat Damaged / Burnt, or Other Serious Visual Defects.
<b>Poor Colour</b>	2% Max by weight, of which Max 1% by weight Fungal Affected (e.g. Ascochyta)	Kernel is distinctly blemished and / or off colour from the characteristic yellow colour of the predominating class, including green. Must comply with the 1% Fungal Affected detailed below.
<b>Fungal Affected (e.g. Ascochyta)</b>	1% Max by weight	Fungal Affected (e.g. Ascochyta) means that a lesion is visible on the kernel. Classifiers are required to break the seed coat if they are not confident that the lesion has penetrated to the kernel.
<b>Foreign Material</b>	3% Max by weight, includes 2% Max by weight Field Peas and 0.5% Max by weight Unmillable Material	Unmillable material and all vegetable matter other than Desi type Chickpea seed material including not more than 2% by weight of Field Peas.
<b>Unmillable Material</b>	0.5% Max by weight (of which 0.3% Max by weight soil)	Soil, stones, sclerotes and non-vegetable matter. Please read important note re soil contamination – see Point 14 of Procedures.
<b>Snails</b>	One (1) Max	Dead. Whole or substantially whole (more than half) including bodies per 200g sample.
<b>Field Insects</b>	Fifteen (15) Max	Dead per 200g sample. See Appendix C.
<b>Grasshoppers &amp; Locusts</b>	Two (2) Max	Dead or alive per 200g sample. See Appendix C.
<b>Foreign Seeds</b>	----	See Appendix B.
<b>Objectionable Material</b>	Nil tolerance	Includes Objectionable Odour, see Appendix A for more detail.
<b>Ryegrass Ergot</b>	Two (2) cms Max	Pieces laid end to end per 200g sample.

*\* When not in conflict with Storage and Handling Agreement or Marketing Contract.  
Please note that this Export Standard is in addition to the specific quarantine requirements of particular countries, as governed by Plant Export Operations. See Introduction.*

**CSP – 4.1.5 CHICKPEAS – DESI TYPE No. 2 MINIMUM EXPORT  
STANDARD FARMER DRESSED**



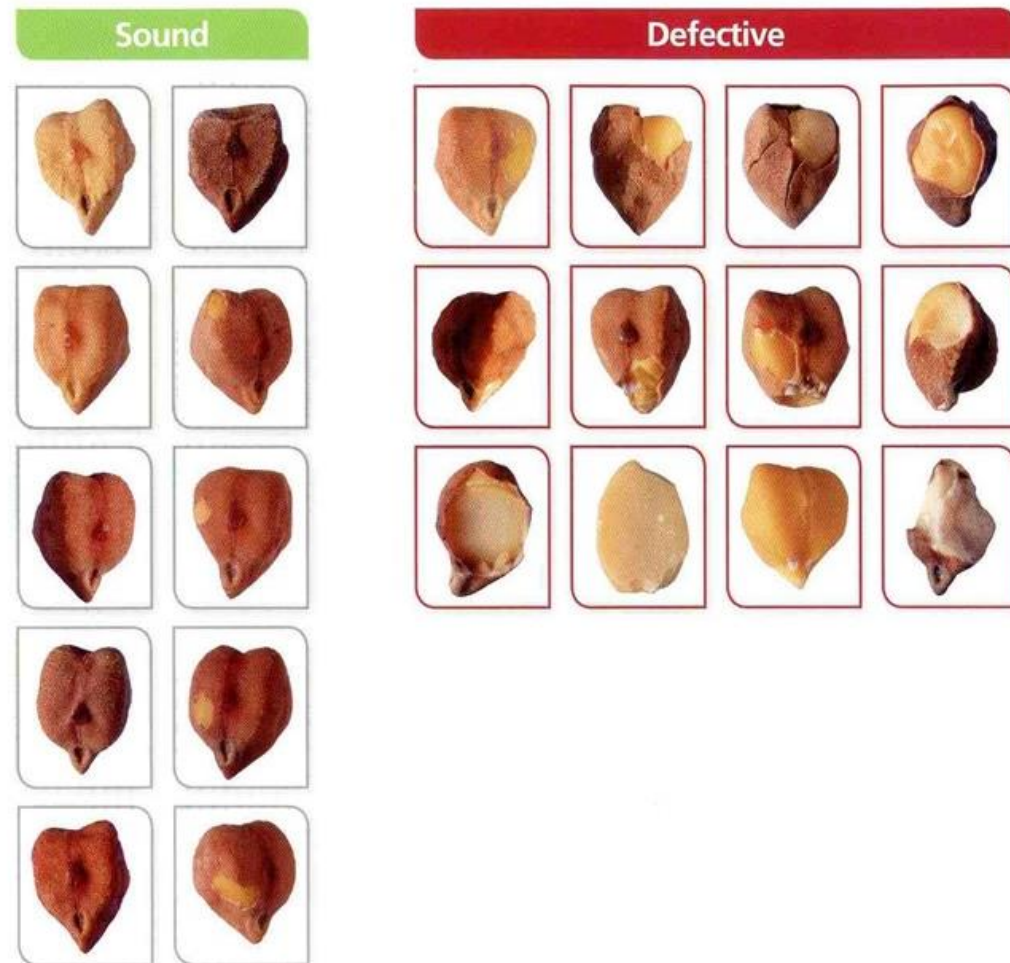
PARAMETER	REQUIREMENTS	COMMENTS / VARIATIONS
<b>Physical Characteristics</b>	The Desi type Chickpeas should be sound, dry, fresh and light to medium brown in colour (a greenish tinge of the seed coat is allowed). Black is excluded as the predominating class.	
<b>Purity</b>	97% Min by weight	Whole Desi type Chickpeas, defective Desi type Chickpeas and Desi type Chickpea seed coats.
<b>Moisture</b>	14% Max	----
<b>Defective</b>	Containers (bulk or bagged): 12% Max by weight. Bulk vessel hold shipment: 15% Max by weight. All include Poor Colour & Severely Damaged	Desi type chickpeas that are broken, chipped, diseased, frost damaged, green, hail damaged, insect damaged, sappy, shrivelled, split, sprouted, weather damaged, wrinkled. Includes pods that contain Desi type chickpeas, whether broken or unbroken, loose seed coats and all Desi Chickpea seed material falling through the 3.97mm slotted screen - see Point 13 of Procedures.
<b>Of which Severely Damaged</b>	1% by weight*	Mould, Heat Damaged / Burnt, or Other Serious Visual Defects.
<b>Poor Colour</b>	5% Max by weight, of which Max 1% by weight Fungal Affected (e.g. Ascochyta)	Kernel is distinctly blemished and / or off colour from the characteristic yellow colour of the predominating class, including green. Must comply with the 1% Fungal Affected detailed below.
<b>Fungal Affected (e.g. Ascochyta)</b>	1% Max by weight	Fungal Affected (e.g. Ascochyta) means that a lesion is visible on the kernel. Classifiers are required to break the seed coat if they are not confident that the lesion has penetrated to the kernel.
<b>Foreign Material</b>	3% Max by weight, includes 2% Max by weight Field Peas and 0.5% Max by weight Unmillable Material	Unmillable material and all vegetable matter other than Desi type Chickpea seed material including not more than 2% by weight of Field Peas.
<b>Unmillable Material</b>	0.5% Max by weight (of which 0.3% Max by weight soil)	Soil, stones, sclerotes and non-vegetable matter. Please read important note re soil contamination – see Point 14 of Procedures.
<b>Snails</b>	One (1) Max	Dead. Whole or substantially whole (more than half) including bodies per 200g sample.
<b>Field Insects</b>	Fifteen (15) Max	Dead per 200g sample. See Appendix C.
<b>Grasshoppers &amp; Locusts</b>	Two (2) Max	Dead or alive per 200g sample. See Appendix C.
<b>Foreign Seeds</b>	----	See Appendix B.
<b>Objectionable Material</b>	Nil tolerance	Includes Objectionable Odour, see Appendix A for more detail.
<b>Ryegrass Ergot</b>	Two (2) cms Max	Pieces laid end to end per 200g sample.

*\* When not in conflict with Storage and Handling Agreement or Marketing Contract.  
Please note that this Export Standard is in addition to the specific quarantine requirements of particular countries, as governed by Plant Export Operations. See Introduction.*



# Visual quality charts

**Defect Type:** Broken, Chipped, Loose Seed Coat and Split



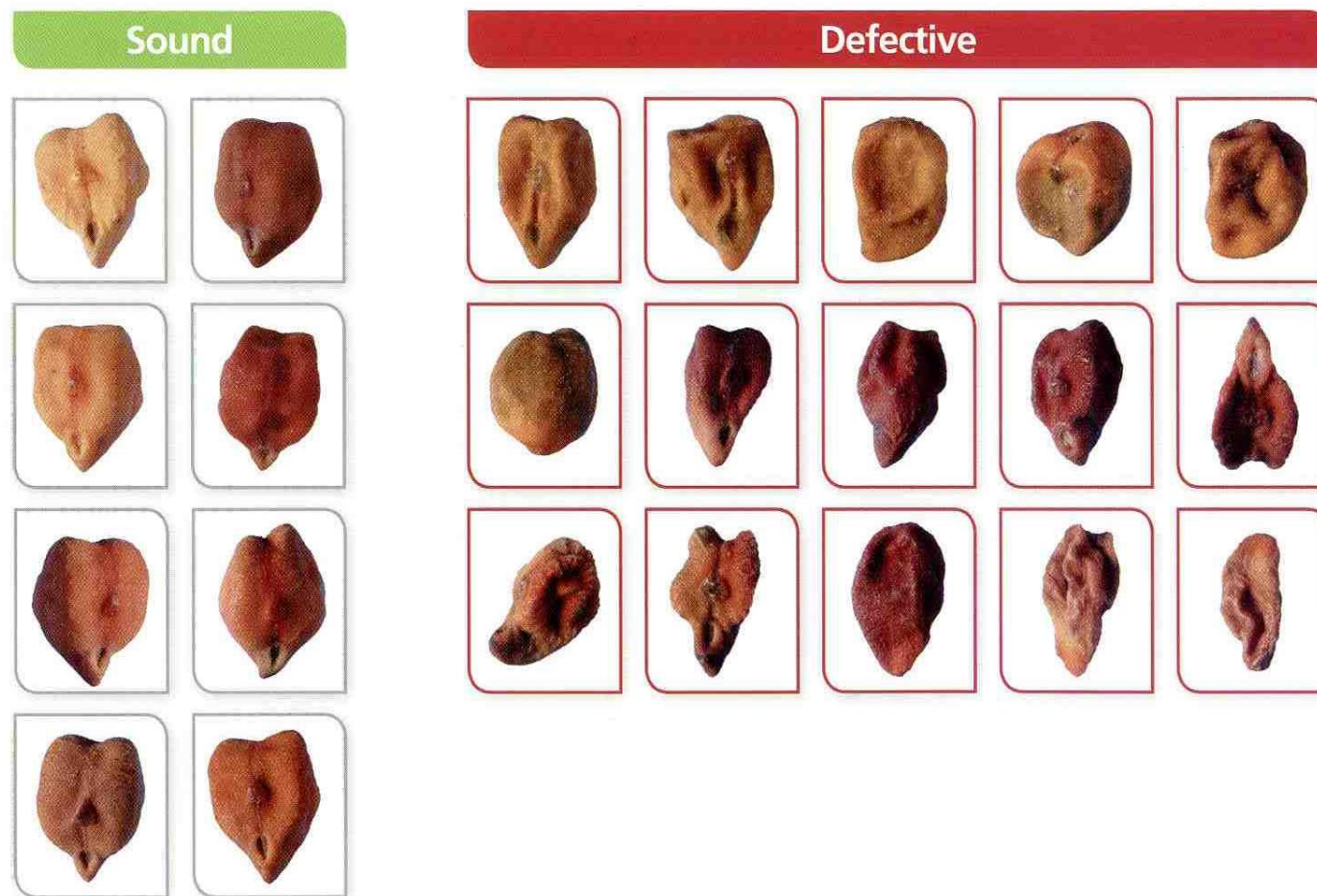
Printed October 2009

Desi Chickpeas: Common Defects



# Visual quality charts

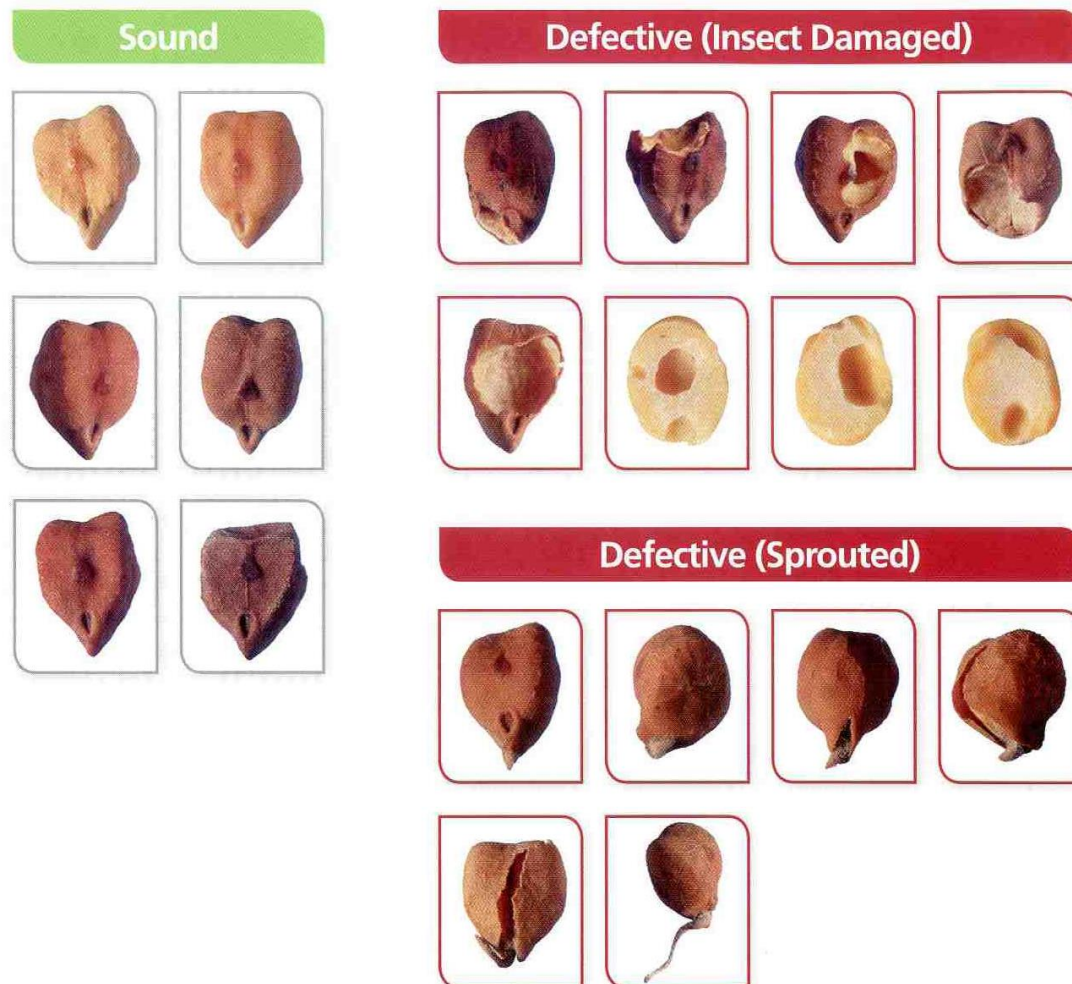
**Defect Type:** Frost Damaged, Shrivelled and Wrinkled



Desi Chickpeas: Common Defects

# Visual quality charts

## Defect Type: Insect Damaged and Sprouted



Desi Chickpeas: Common Defects



# Desi Chickpea Consumer Demand – Bangladesh

- 180kmt to 220kmt from Australia per year
- A predominately whole seed consumer
- Visual quality is very important
- Light tan colour and large size preferred
- Mainly consumed during Ramadan

Queensland sample



Southern NSW sample



**CSP – 5.2.3 FABA BEANS – No. 1 GRADE  
MINIMUM EXPORT STANDARD MACHINE DRESSED**



PARAMETER	REQUIREMENTS	COMMENTS / VARIATIONS
<b>Physical Characteristics</b>	The Faba Beans shall be sound, dry and fresh and light to medium brown or pale green in colour.	
<b>Purity</b>	99% Min by weight	Whole Faba Beans, defective Faba Beans and Faba Bean seed coats.
<b>Moisture</b>	14% Max	----
<b>Defective</b>	Containers (bulk or bagged): 6% Max by weight Bulk vessel hold shipment: 10% Max by weight All include Poor Colour	Faba Beans not of the specified variety and Faba Beans that are broken, chipped, diseased, frost damaged, green, insect damaged, sappy, shrivelled, split, sprouted, stained, weather damaged, wrinkled. Includes pods that contain Faba Beans, whether broken or unbroken, loose seed coat and all Faba Bean seed material falling through the 3.75mm slotted screen - see Point 13 of Procedures.
<b>Of which</b>		
<b>Severely Damaged</b>	1% by weight*	Mould, Heat Damaged / Burnt, or Other Serious Visual Defects.
<b>Poor Colour</b>	4% Max by weight	Faba Beans with excessive discolouration of the seed coat as per the Pulse Australia Faba Bean Visual Quality Charts. Includes Fungal Affected (e.g. Ascochyta) lesions.
<b>Foreign Material</b>	1% Max by weight, includes 0.1% Max by weight Unmillable Material	Includes unmillable material and all vegetable matter other than Faba Bean seed material. Foreign Material includes stalks and plant material that may be connected to the plant.
<b>Unmillable Material</b>	0.1% Max by weight	Includes soil, stones, sclerotes and non-vegetable matter. Please read important note re soil contamination – see Point 14 of Procedures.
<b>Snails</b>	Nil Tolerance	----
<b>Field Insects</b>	Two (2) Max	Dead per 400g sample. See Appendix C. Includes Grasshoppers and/or Locusts.
<b>Foreign Seeds</b>	----	See Appendix B.
<b>Objectionable Material</b>	Nil tolerance	Includes Objectionable Odour, see Appendix A for more detail.
<b>Ryegrass Ergot</b>	Nil tolerance	----

*\* When not in conflict with Storage and Handling Agreement or Marketing Contract.  
Please note that this Export Standard is in addition to the specific quarantine requirements of particular countries, as governed by Plant Export Operations. See Introduction.*

# Faba Bean

Light, even colour



VS

Assorted Defective





# Machine Dressed Mungbean Standards

# Machine Dressed Mungbean Standards

Machine dressed mungbean standards certificate to be issued only by AMA-accredited laboratories.

Grade	Sprouting	No. 1	Processing	Manufacturing
<b>Appearance</b>	Equal to or better in appearance when compared to the AMA Mungbean Type Sample and the photographic charts and parameters.  This is equal to or better than the Processing Grade AMA Mungbean Type Sample.  For AMA Black Mungbean Types ONLY: The AMA Mungbean Type Sample has an even appearance, but 1.0% brown seed is acceptable.	Equal to or better in appearance when compared to the AMA Mungbean Type Sample and the photographic charts and parameters.  The AMA Mungbean Type Sample has a brighter appearance than the Processing Grade and colour is to be more uniform.	Equal to or better in appearance when compared to the AMA Mungbean Type Sample and the photographic charts and parameters.	Equal to or better in appearance when compared to the AMA Mungbean Type Sample.
<b>Purity</b>	99%  Inert / Foreign Material ≤ 1% Including: Splits ≤ 1% Soil/stone ≤ 0.1% Other seeds ≤ 0.1% Weeds to be reported	99%  Inert / Foreign Material ≤ 1% Including: Splits ≤ 1% Soil/stone ≤ 0.1% Other seeds ≤ 0.2% Weeds to be reported	99%  Inert / Foreign Material ≤ 1% Including: Splits ≤ 1% Soil/stone ≤ 0.1% Other seeds ≤ 0.3% Weeds to be reported	98%  Inert / Foreign Material ≤ 2% Including: Splits ≤ 2% Soil/stone ≤ 0.1% Other seeds ≤ 0.5% Weeds to be reported
<b>Size Range</b>	<b>All Grades</b>  AMA Large Green Mungbean Type AMA Small Green Mungbean Type AMA Black Mungbean Type AMA Dull Mungbean Type	98% to be retained above or between screens using 'Ten Shakes' sieving method  98% of Seed > 3.25mm Slotted screen 98% of Seed > 2.0 mm Slotted screen and < 3.25mm Slotted screen 98% of Seed > 3.0mm Slotted screen 98% of Seed > 3.25mm Slotted screen		
<b>Moisture</b>	12%	12%	12%	12%
<b>Defect type* – refer to photographic charts.</b>				
<b>Pod Scale*</b>	3%	3%	12%	NA
<b>Seed Coat*</b>	1%	1%	2%	NA
<b>Stained*</b>	1%	1%	2%	NA
<b>Wrinkled*</b>	4%	4%	12%	NA
<b>Objectionable material</b>	Nil Tolerance	Nil Tolerance	Nil Tolerance	Nil Tolerance
<b>Germination</b> Excluding hard seeds	90%	NA	NA	NA
<b>Over-soaks</b>	10%	NA	NA	NA
<b>Charcoal Rot</b>	Absent at 28°C	NA	NA	NA
<b>Salmonella spp.</b>	Nil/25g	NA	NA	NA
<b>E. coli</b>	≤20cfu/g	NA	NA	NA
<b>Listeria monocytogenes</b>	≤100cfu/g	NA	NA	NA
<b>Sprout Test</b>	Suitable	NA	NA	NA

\* To be determined in accordance with the applicable defect type chart.  
NA = Not Applicable

Adopted: 1 August 2019

## EXPLANATION OF THE AMA MACHINE DRESSED STANDARDS

**1. Machine Dressed:** All mungbeans covered by these Standards are to be Machine Dressed (MD). Machine Dressed Mungbeans are defined as Farmer Dressed mungbeans that have received further post-harvest seed cleaning. It is a **requirement** that this further seed cleaning utilises both air-and-screen grading as well as gravity-grading equipment to substantially remove undesirable material.

**2. Sampling:** For testing purposes, seed lines are to be represented by samples responsibly collected in accordance with a recognised sampling procedure such as those prescribed by Australian government regulatory authorities.

**3. Appearance:** Based on visual assessment against the standard sample at the time of testing. Appearance is determined on uniformity of colour, shades of colour, insect damage, lustre, brightness of colour, condition of skin coat and any other characteristics that effect appearance. In conjunction with appearance test a photographic chart and parameters are to be used to determine overall grade.

**4. Purity:** In accordance with ISTA rules (with the addition of analysis and reporting of splits).

**5. Size Grading:** 98% must be above or between the screens as pertinent. The actual percentage and relevant AMA Mungbean Type will be recorded on the certificate.

**6. Moisture:** In accordance with ISTA rules.

**7. Defect Type:** Photographic charts are to be used in conjunction with appearance and parameter tests to determine overall grade. The five defect types; pod scale, seed coat damage, stained, wrinkled and dimples are identified using photographic charts to determine sound and defective seeds.

**8. Objectionable Material:** As per Pulse Australia definition for objectionable material.

**9. Germination:** In accordance with ISTA rules. Hard seed to be reported. Hard seeds not to be counted (excluded) as germinable seed.

**10. Over-soaks:** Percentage of mungbeans that absorb moisture after being submerged in water at 32°C for one hour.

**11. Charcoal Rot:** Presence of Charcoal Rot tested at 28°C for four days, to be recorded on the Certificate of Analysis.

**12. Microbiological Standards:** In accordance with Food Standards Australia and New Zealand (FSANZ) – Seed Sprouts (Standard 4.2.6). Pathogen test results are to be recorded on Certificate of Analysis.

- a. Salmonella spp. = Nil/25g
- b. Escherichia coli ≤ 20cfu/g
- c. Listeria monocytogenes ≤ 100cfu/g

**13. Sprout Test:** As per AMA approved procedures

Lowest grade of any one of the above tests will be the overall grade given.

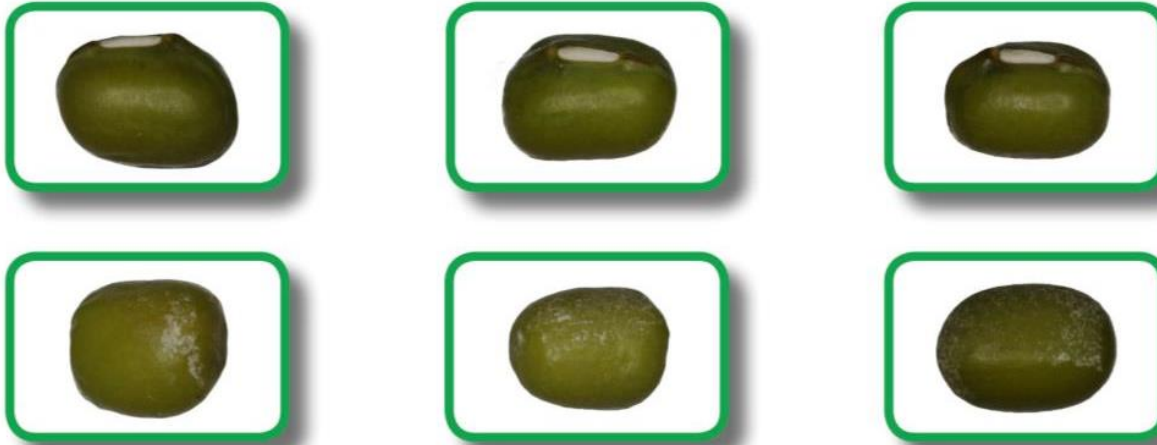
Below manufacturing grade is 'Sale by Sample'.

## ENQUIRIES

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## Sound



## Defective (Pod Scale)







## Sound



## Defective (Cracked/Missing/Chipped)



## Defective (Insect Damage)

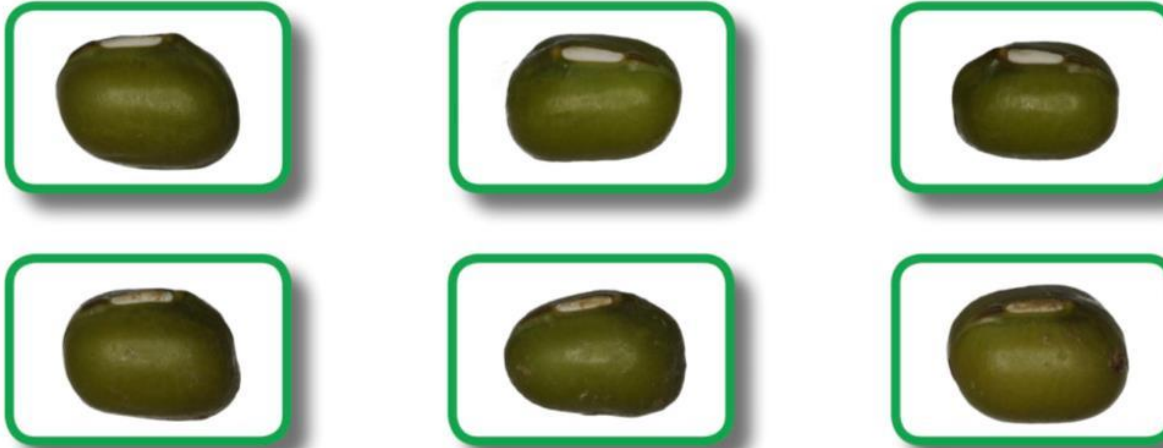


## Defective (Shot & Sprung)





## Sound



## Defective (Stained)



# Pulse quality management



## Chemical Use

### Always read the label

Residue limits in any crop are at risk of being exceeded or breached where pesticides:

- Are applied at rates higher than the maximum specified.
- Are applied more frequently than the maximum number of times specified per crop.
- Are applied within the withholding period
- Are not registered for the crop in question.
- Contaminated trucks and augers, make sure they're cleaned before harvest



# Chickpea quality management



## Early harvest

- Can minimise seed infection.
- Important for grain quality and to minimise harvest losses and fire risk.
- Can prevent high levels of virus incidence and severity.
- Crop desiccation can permit earlier harvest but premature desiccation of grain will reduce quality.
- Care needs to be taken when using desiccants to ensure no residues in grain.

# Pulse Grain Storage

- Ideal moisture content is 12% (needs to be <14%)
- Pulses will darken with time and high moisture (esp. Faba beans)
- Poor storage conditions will reduce grain quality
- Use clean and sealed silos
- Don't use silo bags for long term storage < 8-12 weeks
- Monitor for insect activity
  - Insects are not a high risk in pulses
  - Insects will be attracted to harvest trash in the silo
  - Phosphine is the only registered fumigant for pulses

# Development of a Classification System

- Classifications are based on varieties end use (whole grain, split, flour).
- Can create market premiums for differences in quality for splitting, milling or cooking characteristics.
- Classification relates to the end use.
- Grading relates to the standards.
- Need to identify characteristics the market values.
- Look at existing varieties end uses, document what the existing varieties are used for.
- Pulse Australia facilitate the interaction of traders and plant breeders showing new varieties at AGIC and other forums (field days).

# Objective Measurement and Sampling

- Many grains (wheat, barley, canola) use objective measurement such as protein %, oil content, falling number index (starch content), test weight.
- Pulses in general are mostly assessed by visual standards.
- Research is underway to develop objective measurement of all the parameters using Artificial Intelligence. Funding provided by Australian Institute of Machine Learning. Uses a camera to capture images of grain.
- Review of standard sampling method also to be conducted (static trucks) to improve the procedures.



# Grain Trade Australia Training Online + F2F



GTA TRAINING AND DEVELOPMENT PROGRAM		
 <a href="#">Register here</a>		<b>WORKSHOP SCHEDULE - SEMESTER 2</b>  Fact to Face Workshop  Zoom Workshop  2021
	<b>7-8 July</b>	<b>Grain Merchandising</b> 2 day course, Lloyd George
	<b>27 July</b>	<b>Advisory &amp; Compliance Day</b> 1 day course, Various presenters
	<b>2 Aug</b>	<b>Grain Trading Standards</b> 1 day course, Presenter - Gerard McMullen
	<b>17-18 Aug</b>	<b>Grain Export Execution &amp; Risk Management</b> 2 day course, Various presenters
	<b>19 Aug</b>	<b>Grain Trading Standards</b> 1 day course, Presenter - Gerard McMullen
	<b>31 Aug</b>	<b>Grain Trading Standards</b> 1 day course, Presenter - Gerard McMullen

# Contact Details



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# Webinar Survey



- We appreciate feedback to help improve our service.
- It is very quick and easy (tick and flick)
- We will send you all an email with the link
- Thanks
- <https://www.surveymonkey.com/r/DKGG3GJ>