



Visual Recognition Standards Guide FOR GRAIN COMMODITY SAMPLING & ASSESSMENT

Issued for 2015-2016





Visual Recognition Standards Guide Issued 1st August 2015

Grain Trade Australia (GTA)

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INTRODUCTION

Defective Grains

This guide is produced to assist samplers and assessors of grain in the determination of defective grains which are covered by the Grain Trade Australia (GTA), Australian Oilseeds Federation (AOF), and Pulse Australia standards.

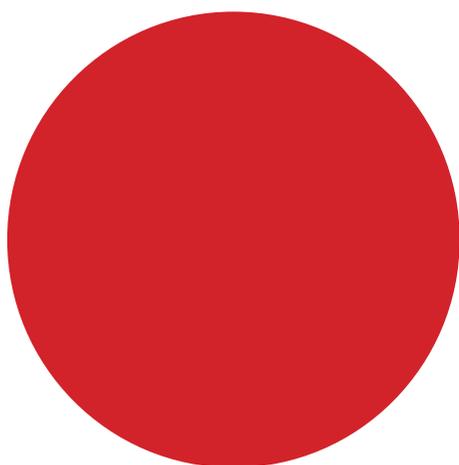
All images in this guide (unless otherwise identified) are defective. These photographs depict the minimum standard for a grain to be assessed as defective. If a grain defect does not meet the physical attributes depicted in the photograph it is to be assessed as sound.



Pictures shown at this size are an approximate size of the original grain only.
These pictures are enlarged to assist in illustration of the defect.

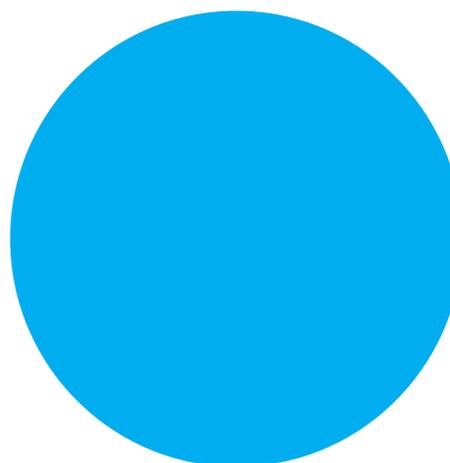
Calibration

A calibration sheet is provided for those who are downloading and printing these guides. Careful calibration of these photographs is vital as monitors and printers may vary.



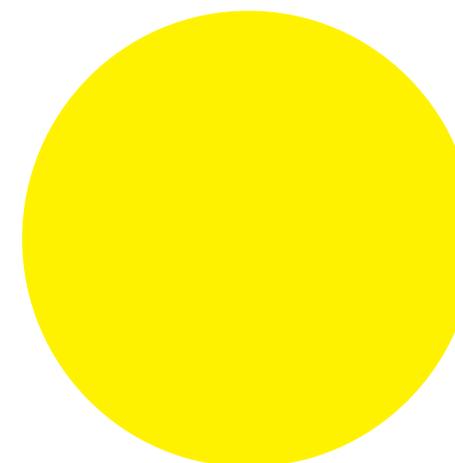
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C=15 M=100 Y=100 K=0

Minolta Value:
L= 48.59 a= +51.21 b= +31.27



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Minolta Value:
L= 55.41 a=-17.28 b=-43.99



CMYK Value:
C=0 M=0 Y=100 K=0

Minolta Value:
L= 87.53 a=-10.50 b= +80.56

NOTE: The hardware (monitor, graphics card, etc.) Used to display the images in Inspector Standardisation content influences the appearance of the images. As a result the images may have a slightly different appearance when viewed on different makes/models of computer and display. These images were created using a Dino-Lite Pro AM-413T, calibrated LCD display with 1680x1050, 32 Bit, 60 Hz resolution and the following calibration settings:

Brightness: 0

Contrast: 50

Gamma: 1.0

Hue: 0

Saturation: 0

The VRSg should be viewed using a computer with digital video (DVI) output and an EIZO CG19, EIZO S1921, EIZO S1932, EIZO S1961, or EIZO CE210W display.

Paper Type for Printing: Brand: Office Elements

GSM: 80gsm

Colour: White

Laminate material:

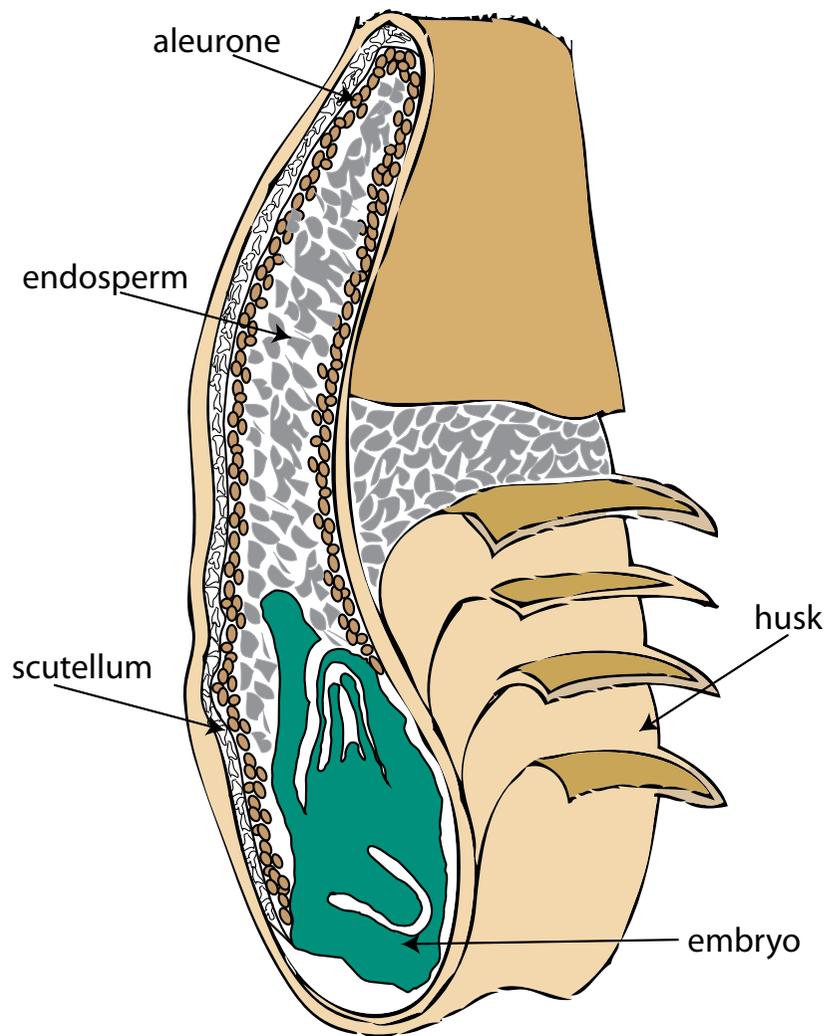
Brand: OfficeMax 125 Micron laminating pouches

Re-Order Code: 1950630

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Section 1

BARLEY: Common Defects



Barley Grain



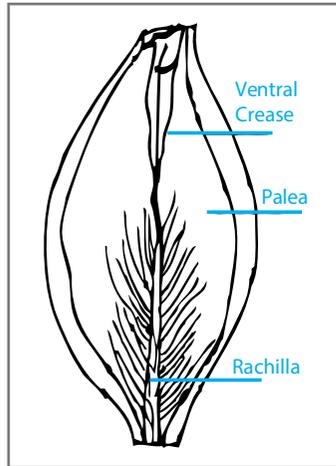
Section 1.1 - Varietal Identification: Barley

Issued: 1st August 2015

Definition: The main characteristic used in identifying barley varieties is the length of the hairs on the Rachilla. The Rachilla is white in colour and found running along the grain furrow from the germ end. There are two main types of Rachilla hair length, that being long hairs, and short woolly hairs.



Long



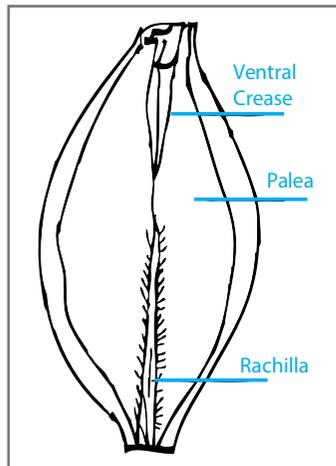
Long

Common Varieties including:

Bass, Baudin, Buloke, Dhow, Fairview, Fitzroy, Flagship, Flinders, Grange, Hamelin, Henley, Navigator, Scope, Tallon, Wimmera



Short



Short

Common Varieties including:

Arapiles, Commander, Gairdner, Grimmett, Hindmarsh, LaTrobe, Schooner, Sloop, SloopSA, SloopVIC, Stirling, Westminster

“Awn End of Grain”



Dorsal (Back)



Ventral (Front)

“Germ End of Grain”

For a complete list of all Barley varieties, please visit the Barley Australia website. <http://www.barleyaustralia.com.au>

Section 1.2 - Barley: Common Defects

Issued: 1st August 2015

Sprouted

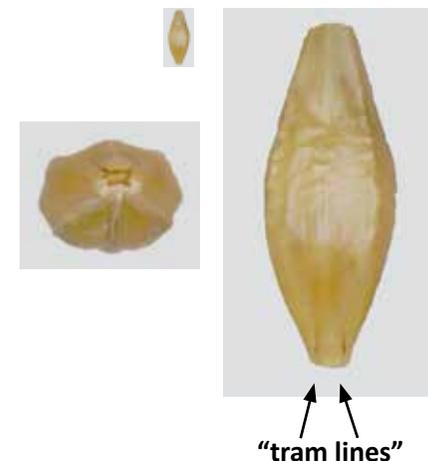
Definition: Sprouted grains are those with any visible evidence of the shoot or root system beginning to emerge from the germ.



Shot

Definition: Barley grains exhibiting the following outward signs of having commenced germination are classified as Shot:

- Opening of the grain at the germ end and/or
- The husk has a distinct pin hole at the germ end or has 'tramlines' on both sides where the husk has begun to lift on each side on the back of the grain at the germ end.



Dark Tipped (WA - Germ End Stained)

Definition: Dark tipped refers to staining caused by excess moisture and / or humidity or a stress related biochemical reaction towards the end of the growing period and into harvest. Often grains exhibit a distinct dark brown to black discoloration. This mainly occurs at the germ end of the grain however in severe cases it may progress to other parts of the grain. Dark tipping equal to or greater than 1 mm is classified as defective grain.

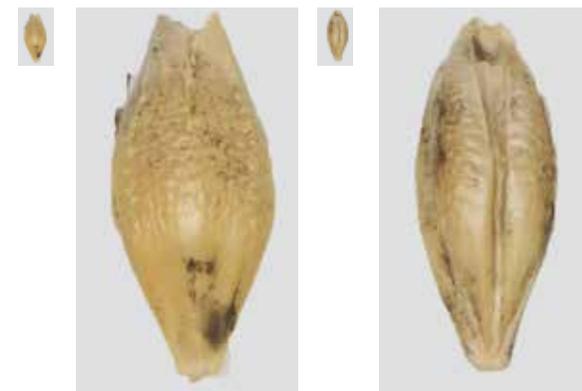
Note: image represents the minimal level of intensity of colour and 1mm length.



Field Fungi (WA - Spotted/Mould Affected)

Definition: Field Fungi refers to individual kernels where the seed coat has the appearance of black spotting occurring anywhere on the grain. Coverage greater than approximately 10% of the grain surface is considered defective.

Grains that show a coverage of approximately 10% or less are to be classified as sound.



Section 1.3 - Barley: Common Defects

Issued: 1st August 2015

Skinnings (WA - Skinned)

Definition: Skinnings is usually caused by mechanical damage to the grain during harvesting. Skinnings may also be caused by over-handling of grain in storage or by specific weather conditions prior to harvest.

Skinnings is defined as damage to the protective husk of the barley.

Each grain exhibiting one of more of the following characteristics is assessed as a skinned grain:

- Awn Skinning- Greater than a third of the husk from the awn end towards the centre of the grain has been removed.
- Germ Exposed- The husk is removed from the germ end of the grain or been damaged other than Shot or Sprouted or the germ itself has been removed.
- Pearled- The entire husk has been removed.
- Side Skinning- Part of the husk is missing from the side of the grain on the two-thirds of the grain closest to the germ end.
- Split Backs- The husk is split along the length of the centre ridge of the back of the grain.
- Split Skirt- The husk is split along the centre or side edges, on the back of the grain, at the germ end.
- Ventral Skinning- Part of the husk is missing from the ventral side of the grain on the two thirds closest to the germ end.



Awn Skinning



Germ Exposed



Pearled



Side Skinning



Split Backs



Split Skirt



Ventral Skinning

Section 1.4 - Barley: Common Defects

Issued: 1st August 2015

Cleaved (front, back and side)

Definition: Cleaved barley is generally caused by rainfall events or rapid changes in moisture when grain is maturing. This results in a split along the crease or a split down the back, front or side of the grain exposing the endosperm.

Any visible cleaving is considered defective.



Frost Damaged

Definition: Refers to grain damaged as a result of frost during the maturation phase. Frost Damaged barley grains appear pinched and sunken in on the back, usually on the awn half of the grain. In severe cases the kernel under the husk may appear orange.



Insect Damaged

Definition: These are grains eaten in part by Stored Grain Insects and any field pest of grains including *Heliothis spp.*

Note: Any visible insect damage to the grain is to be classified as defective.



Broken

Definition: Refers to grain that is mechanically damaged due to the harvesting or handling process with a quarter or more of the grain missing. This includes any mechanical damage to the germ



Section 1.5 - Barley: Common Defects

Issued: 1st August 2015

Dry Green or Sappy

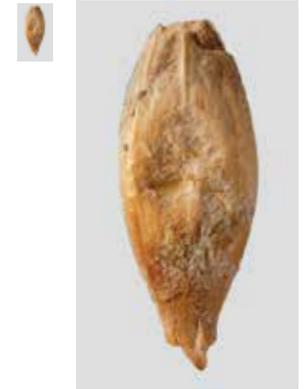
Definition: Dry Green refers to green grains arising from harvesting of grain before it has matured. Dry Green grains are those whose surface is distinctively green. Dry Green grains are usually dry and hard.

Sappy grains are those that have been harvested before maturity. Sappy grains are generally soft when pressed. They may or may not be green. Any level of sappiness is classified as defective.



Storage Mould

Definition: Storage Mould refers to kernels that have become affected by the development of fungi or bacteria due to an increase in grain moisture levels during storage. Affected grains appear discoloured and visibly affected by mould.



Heat Damaged, Bin Burnt

Definition: Heat Damaged or Bin Burnt refers to those kernels that have become discoloured due to exposure to severe heat during storage or an incorrect artificial drying technique. Affected grains appear reddish brown, or in severe cases, blackened.



Sound Grain

Section 1.6 - Barley: Common Defects

Issued: 1st August 2015

WA - Heavily Discoloured

Definition: These are grains where the staining is dark and burnt in appearance. Usually affecting more than the germ end.



WA - Fusarium / Pink Staining

Definition: Grains showing an orange, pink to red discolouration found anywhere on the grain, but predominately in the crease or within the cleave of cleaved grain.



Section 1.7 - Barley: Pickling

Issued: 1st August 2015

Pickling Compounds or Artificial Colour (WA - Pickled Barley)

Definition: Pickling Compounds are those chemicals added to grain as a seed treatment or as a seed dressing prior to sowing. This includes grains that may be affected by marker dye commonly used during crop spraying operations that has stained the barley. They are usually associated with a colouring agent.

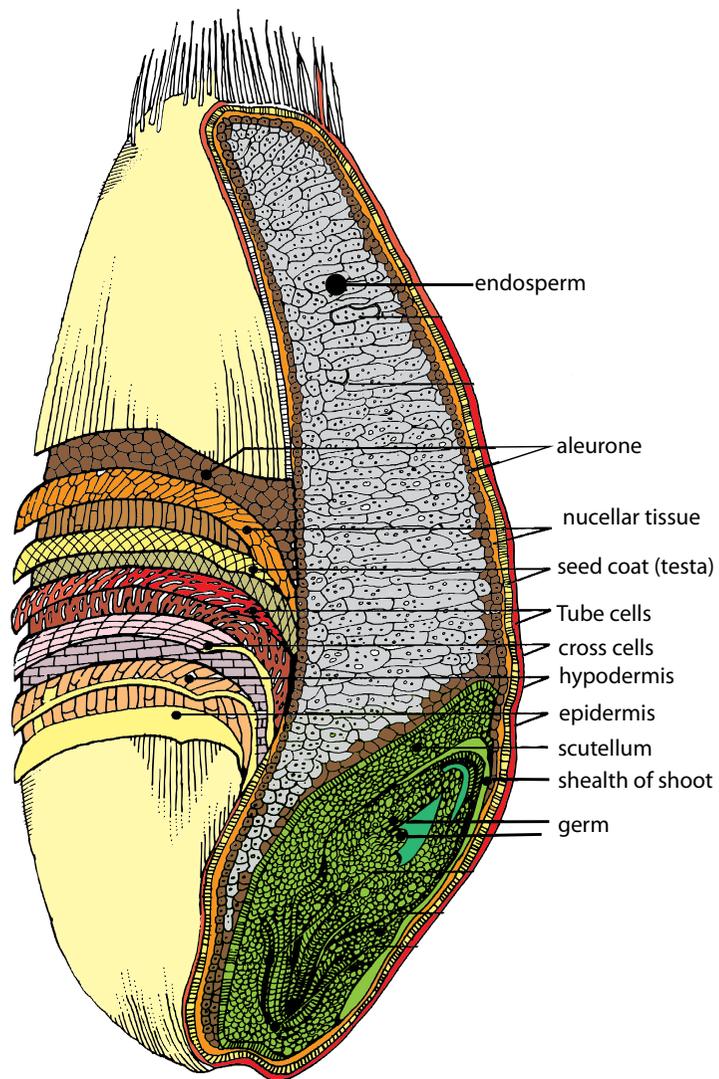
Grains contaminated in this way may be identified by an unnatural surface colour and/or colour that rubs off. Any grains that are artificially coloured regardless of intensity are defective.

Note: These photographs are to illustrate artificial colours and appearance only. A **nil tolerance** applies to any pickling compounds, regardless of intensity or coverage or colour.



Section 2

WHEAT: Common Defects



Wheat Grain

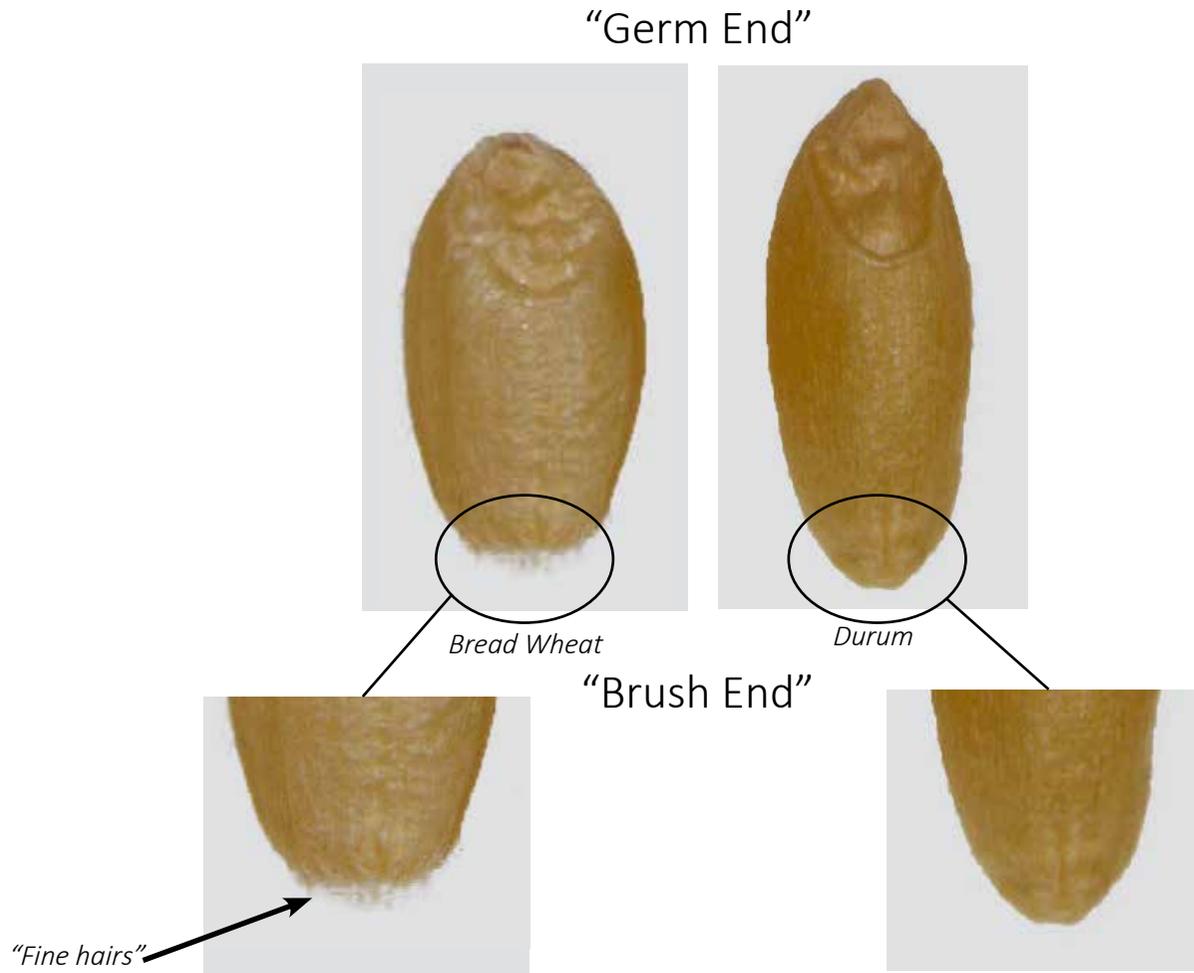


Section 2.1 - Durum Identification

Issued: 1st August 2015

Commodity: **Durum Identification from Bread Wheat**

Description: Bread Wheat can be visually distinguished from Durum by the “fine hairs” on the brush end of the grain. These hairs are only associated with Bread Wheat varieties.



Section 2.2 - Wheat: Common Defects

Issued: 1st August 2015

Pink Stained

Definition: This is a grain defect arising from infection by fungal species which give the seed coat a distinct pink discolouration. This defect is included in the tolerance for "Stained". Grains that are pink but also contain a white to light grey fungal like discolouration over more than approximately 50% of the seed coat surface are to be classified as "White Grain Disorder/Head Scab/Flaked Grain".



Insect Damaged

Definition: These are grains eaten in part by Stored Grain Insects and any field pest of grains including *Heliothis spp.*

Any visible insect damage to the grain is classified as defective.



Stained (includes black tip, black point, approximately <50% coverage)

Definition: Refers to a grain defect caused by either exposure to wet and damp conditions during growth and maturation phases or a stress related biochemical reaction, which causes individual grains to become visually discoloured on less than approximately 50% of the grain surface.

A distinct dark brown to black discolouration on the germ end that, in severe cases, may progress to other parts of the grain such as the crease. These grains are commonly referred to as "black point" or "black tip".



Streaking

Brush Ventral

Brush Dorsal

Stained Crease

Black Tip

Discolouration must be more than 50% of the germ in length

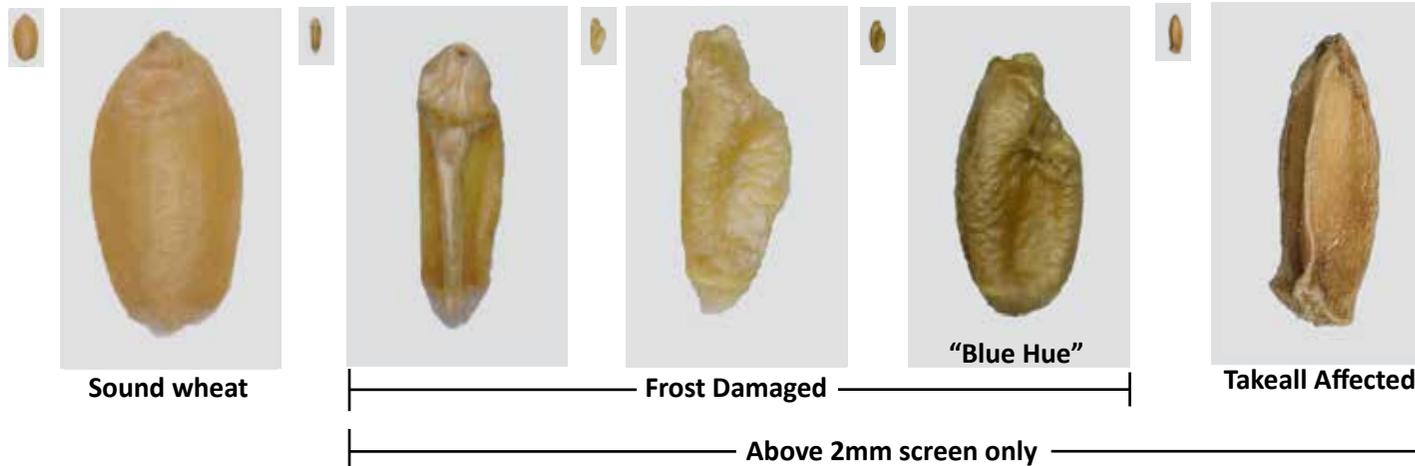
Section 2.3 - Wheat: Common Defects

Issued: 1st August 2015

Frost Damaged, Takeall Affected

Definition: Frost Damaged refers to grain damaged as a result of frost during the maturation phase. Grains generally have the appearance of full sized kernels with little or no structure on both dorsal sides of the grain, and are typically grey to blue in colour. The definition does not include grain pinched as a result of dry conditions or disease during maturation.

Takeall Affected is a grain defect caused by infection by the fungus *Gaeumannomyces graminis* often resulting in distortion of the grain. This definition only applies to those grains which appear yellowish or white in colour and which have a hollowed out appearance. The definition does not apply to those grains affected by Frost or pinched as a result of dry conditions or other diseases during maturation.



Sprouted

Definition: Sprouted grains are those in which the covering of the germ is split. It includes early and any further advanced stage of growth of the germ. Kernels exhibiting early stages of sprouting are those where the covering of the germ is split, but without further development of the shoot. Grains that have had the germ knocked off or scalloped out due to header damage or grains with pin holes are not included in this definition.



Dry Green or Sappy

Definition: Dry Green refers to green grains arising from harvesting of grain before it has matured. Dry Green grains are those whose surface is distinctively green. Dry green grains are usually dry and hard.

Sappy grains are those that have been harvested before maturity. Sappy grains are generally soft when pressed. They may or may not be green. Any level of sappiness is classified as defective.



Section 2.4 - Wheat: Common Defects

Issued: 1st August 2015

Field Fungi

Definition: Field Fungi refers to individual kernels where more than half of the seed coat is discoloured. The visible discolouration of affected grains can vary from dark grey, brown to black in colour.

Grains that are approximately 50% or less discoloured are to be classified as Stained.

Grains that are soft (and not classified as Sappy) and/ or emit a mouldy odour are to be classified as Rotted.



Heat Damaged or Bin Burnt

Definition: Heat damaged or bin burnt refers to those kernels that have become discoloured due to exposure to severe heat during storage or an incorrect artificial drying technique.

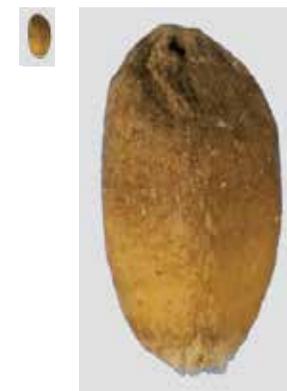
Affected grains appear reddish brown, or in severe cases, blackened.



Sound wheat

Storage Mould

Definition: Storage Mould refers to kernels that have become affected by the development of fungi or bacteria due to an increase in grain moisture levels during storage. Affected grains appear discoloured and visibly affected by mould.



Section 2.5 - Wheat: Common Defects

Issued: 1st August 2015

White Grain Disorder/Head Scab/Flaked Grain

Definition: White Grain Disorder is caused by the fungus *Botryosphaeria spp.* Head Scab is caused by the fungus *Gibberella zeae* (also called *Fusarium graminearum*). Both are classified under the heading “Stained”. These two quality parameters are combined into the one category as they are difficult to distinguish.

Grains appear white to light grey but may also contain a pink discolouration. Grains are only to be classified as “White Grain Disorder/Head Scab” if the discolouration is over more than approximately 50% of the seed coat surface. If the discolouration is less than approximately 50% of the seed coat surface, grains may be classified as Stained.

This defect may cause grain to appear as “flaky”. For a grain to be classified as ‘flaky’ within this definition, it must also be affected by White Grain Disorder. If a grain is ‘flaky’ but not classified as White Grain Disorder, it is to be considered as a sound grain.



Sound wheat

Mottled
(not defective)

Bleached
(not defective)

White Grain Disorder / Head Scab / Flaked Grain

Note: The Sound, Mottled and Bleached kernels are provided for contrast and are not to be considered defective.

Note: above grains are all classified as defective. These depict the various defects as defined above.

Section 2.6 - Wheat: Common Defects

Issued: 1st August 2015

Ball Smuts

Definition: Are those infected by the spores of the fungus *Tilletia caries*. They have the appearance of pale, plump, slightly oversized grains. These grains are easily crushed between the fingers and contain a mass of black powder (spores) with a distinctive rotten egg smell. This may also be called Stinking Smut or Bunt.



Pickling Compounds or Artificial Colouring (WA - Pickled Wheat)

Definition: Pickling Compounds are those chemicals added to grain as a seed treatment or as a seed dressing prior to sowing. This includes grains that may be affected by marker dye commonly used during crop spraying operations that has stained the wheat. They are usually associated with a colouring agent. Grains contaminated in this way may be identified by an unnatural surface colour and/or colour that rubs off. Any grains that are artificially coloured regardless of intensity are defective.

Note: These photographs are to illustrate pickled colours and appearance only. A **nil tolerance** applies to any pickling compounds, regardless of intensity or coverage.



Section 3

SORGHUM: Common Defects



Section 3.1 - SORGHUM: Common Defects

Issued: 1st August 2015

Heat Damaged

Definition: Heat Damaged refers to those kernels that have become discoloured due to exposure to severe heat during storage or an incorrect artificial drying technique. Affected grains appear reddish brown. Refer also to Maximum Temperature.



Sprouted

Definition: Sprouted grains are those in which the shoot is visibly extending from any part of the germ.

Grains that have had the germ knocked off or scalloped out due to header damage or grains with pin holes are not included in this definition.



Bin Burnt

Definition: Bin Burnt refers to those kernels that have become discoloured due to exposure to severe heat during storage or an incorrect artificial drying technique. Affected grains appear reddish brown, or in severe cases, blackened. Refer also to Maximum Temperature.



Insect Damaged

Definition: These are grains eaten in part by Stored Grain Insects and any field pest of grains including *Heliothis spp.*

Note: Any visible insect damage to the grain is to be classified as defective.



Section 3.2 - SORGHUM: Common Defects

Issued: 1st August 2015

Storage Mould

Definition: Storage Mould refers to kernels that have become affected by the development of fungi or bacteria due to an increase in grain moisture levels during storage. Affected grains appear discoloured and visibly affected by mould.



Field Fungi

Definition: Field Fungi refers to kernels affected by the growth of fungi on the seed coat. It is usually caused by prolonged exposure to wet and damp conditions during or after maturation. The fungal growth can vary in colour from white, to grey, to black. It does not refer to the more serious Storage Moulds.



**Stained
(Not defective,
Not to be assessed)**

**Field Fungi
(Defective)**

Section 3.3 - SORGHUM: Common Defects

Issued: 1st August 2015

Honeydew

Definition: Honeydew is a sticky exudates produced by the sorghum plant in response to any predator attack, including Ergot. Honeydew oozes out of the flowers and drips onto leaves of the sorghum plant. It causes seeds to stick together and can make crops difficult to harvest and prevent harvested grain from running through equipment.

Honeydew is acceptable if the grain is able to flow freely.



Sorghum Ergot

Definition: Sorghum Ergot, *Claviceps africana*, occurs during flowering and results in the accumulation of a grey/white fungal mass, often found in empty seed glumes. Another ergot, *Cerebella spp.* is not a true ergot as such, but it is a fungus that often grows on the *Claviceps africana*, producing a large black mass. Note that there may be separate tolerances for Sorghum Ergot and Cereal Ergot.

Note: Any visible ergot to the grain is to be classified as defective.



Claviceps africana

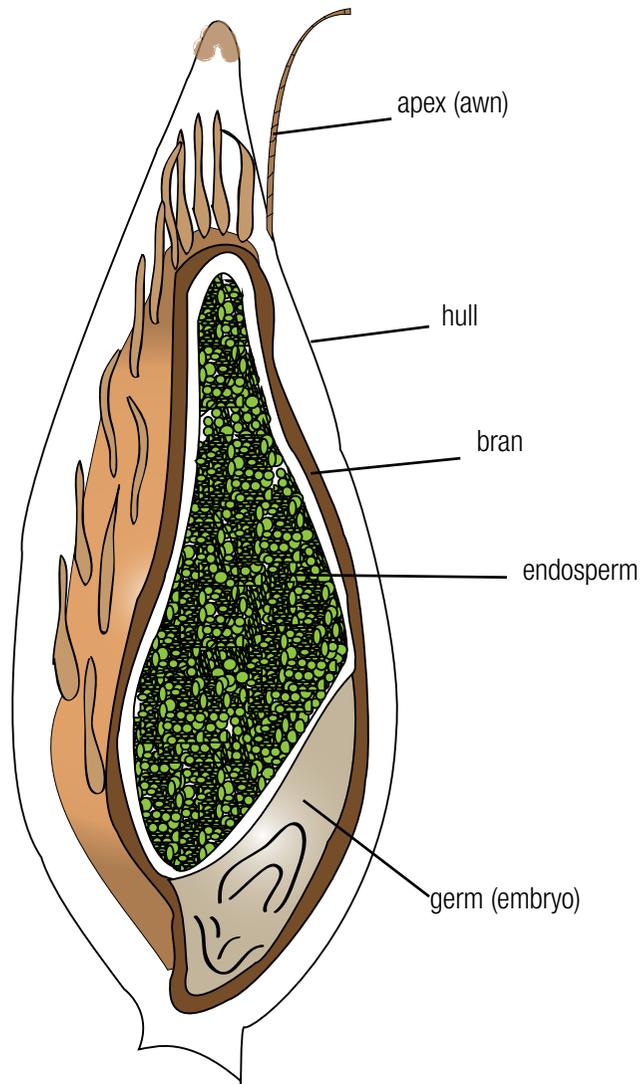


Cerebella spp.

These pictures are typical of ergot but are not a minimum standard.

Section 4

OATS: Common Defects



Groat



Oat



Section 4.1 - OATS: Common Defects

Issued: 1st August 2015

Damaged Grains

Definition: Refers to grain that is mechanically damaged due to the harvesting or handling process with a quarter or more of the grain missing. This includes any mechanical damage to the germ.



Sound Grain

Field Fungi (WA - Spotted Mould Affected)

Definition: Field Fungi refers to individual kernels where the seed coat has grey to black spotting occurring anywhere on the grain. Coverage greater than approximately 10% of the grain surface is considered defective.



Grains that show approximately 10% or less discolouration are to be classified as sound.

Grains that are soft (that are not classified as Sappy) and/or emit a mouldy odour are to be classified as Musty or Mouldy.

Weather Stained Grains (WA - Heavily Discoloured)

Definition: Weather Stained Grains are caused by damp weather prior to harvest. Weather Stained Grains are those grains where greater than approximately 50% of the grain surface is discoloured. Various colours may be exhibited such as brown to black.

Grains that are affected by Field Fungi or Mould are not included in the definition of Weather Stained Grains.

Where Weather Stained Grains are present in a sample the husk is to be removed and the Groat examined to determine if the defect is present.



Weather Stained Groats

Definition: Weather Stained Groats are those that have been stained by damp weather prior to harvest. This defect is checked where Weather Stained Grains are present in the sample. Where this staining has occurred, the husk is to be removed and the Groat examined.

Various colours such as light brown to black may be represented by this defect.

Any discolouration from the normal colour of the Groat is defective.



Section 4.2 - OATS: Common Defects

Issued: 1st August 2015

Insect Damaged

Definition: These are grains eaten in part by Stored Grain Insects and any field pest of grains including *Heliothis spp.*

Note: Any visible insect damage to the grain is to be classified as defective.



Sprouted

Definition: Sprouted grains are those in which the grain has begun the germination process. A kernel that is Sprouted is one where the shoot is visibly seen growing out from the germ.



Dry Green or Sappy

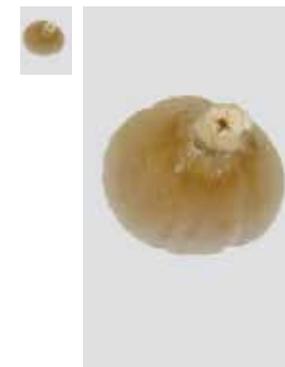
Definition: Dry Green refers to green grains arising from harvesting of grain before it has matured. Dry Green grains are those whose surface is distinctively green. Dry Green grains are usually dry and hard.

Sappy grains are those that have been harvested before maturity. Sappy grains are generally soft when pressed. They may or may not be green. Any level of sappiness is classified as defective.



Shot

Definition: Grains that are Shot are those where the covering of the germ is split, but without further development of the shoot.

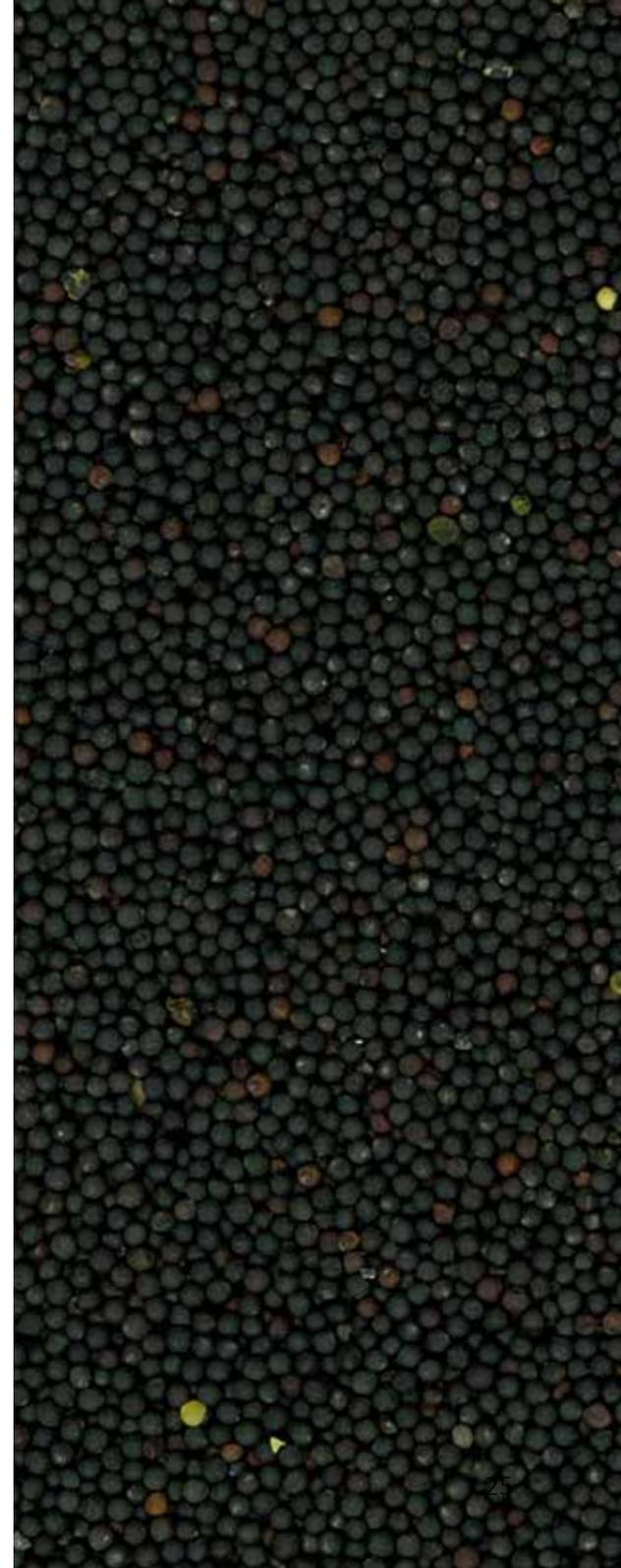


Section 5

CANOLA: Common Defects



Sound Crushed
Canola



Section 5.1 - Canola: Common Defects

Issued: 1st August 2015

Broken or Split

Definition: All hulls, kernels or parts thereof, not otherwise damaged shall be classified as split or broken seed (except fines classified as Impurities). This includes Insect Damaged.



Heat Damaged or Bin Burnt

Definition: Heat Damaged or Bin Burnt seed are those seeds and pieces of seed that are materially discoloured and damaged by heat. Seeds may have a heated odour or a brown powdery appearance when crushed.



Sound Crushed Canola

Defective Crushed Canola

Sprouted

Definition: The seed coat has split and the primary root has emerged. This includes early and any further advanced stage of growth of the primary root. Includes grains where the primary root has been knocked off during the harvesting or handling process.



Weather Damaged

Definition: Weather damaged seeds are those that have been subjected to rain during the maturation phase to the extent that they have become Weather damaged. When seeds are crushed, they may have a grey washed out appearance and a chalky texture.



Sound Crushed Canola

Defective Crushed Canola

Section 5.2 - Canola: Common Defects

Issued: 1st August 2015

Mouldy

Definition: Mouldy refers to seeds that have become affected by the development of fungi or bacteria due to an increase in seed moisture levels during storage or arising in the field. Affected seeds may appear discoloured, rotten, swollen and soft, feel spongy under pressure, show the presence of fungal spores or visibly affected by mould on the seed coat. Includes Field Fungi seeds.



Green Seeds

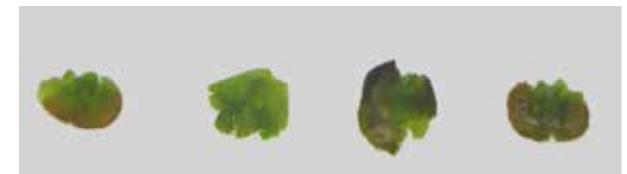
Definition: Green seeds are those that are distinctively green when crushed. Seeds that are yellow-green are not considered green.



Sound Crushed Canola
Yellow when crushed



Sound Crushed Canola
Green tinge when crushed



Defective Crushed Canola
Green Seed – intense green when crushed

Section 6

DESI CHICKPEAS: Common Defects



Chickpea - Desi



Section 6.1 - DESI CHICKPEAS: Common Defects

Issued: 1st August 2015

Bin Burnt and Heat Damaged

Definition: The seed coat appears reddish-dark brown and blackened or burnt in severe cases. These grains may be similar in appearance to Poor Colour brown seeds. An Objectionable Odour must not be detected. Refer also to Mouldy & Caked.



Sound Chickpea

Frost Damaged, Shrivelled and Wrinkled

Definition: Visible damage to the seed coat or size and shape of grain whereby the grains are severely distorted and/or shrunken. Seed coats may tightly adhere to the kernel or be brittle. Seed coats may show a level of discolouration depending on the extent of damage. Grains are often smaller than the majority in the sample.



Sound Chickpea

Section 6.2 - DESI CHICKPEAS: Common Defects

Issued: 1st August 2015

Broken, Chipped, Loose Seed Coat and Split

Definition: Breakage, cracking, peeling or splitting of the seed coat or chipping and splitting of the kernel in various forms as follows.

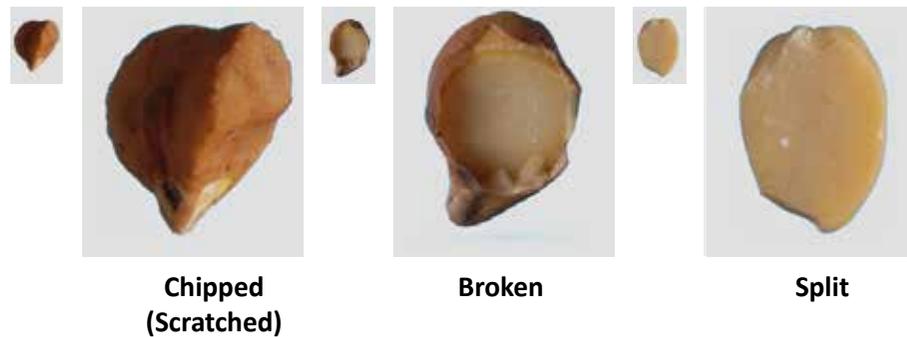
Seed Coat:

- Split Seed Coat- A split in the seed coat running more than half the entire length or across the entire width on one or both sides.
- Skin Damaged- A hole in the seed coat where more than 20% of the seed coat on any one side is missing.
- Loose Seed Coat (Peeling)- Where the seed coat is visibly falling off the kernel to any extent and not adhering tightly to the kernel.
- Missing Seed Coat- Where the entire seed coat is missing but the kernel remains intact.



Kernel:

- Chipped (Scratched) – A part of the kernel is damaged or removed.
- Broken- A split kernel with the seed coat still attached.
- Split – A split kernel with no seed coat attached.



Section 6.3 - DESI CHICKPEAS: Common Defects

Issued: 1st August 2015

Insect Damaged

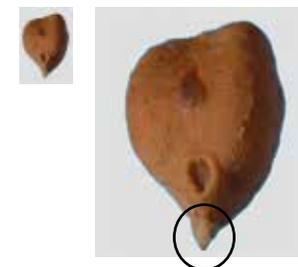
Definition: These are grains eaten in part by Stored Grain Insects and any field pest of grains including *Heliothis spp.*

Note: Any visible insect damage to the grain is to be classified as defective.



Sprouted

Definition: The seed coat has split and the primary root has emerged. This includes early and any further advanced stage of growth of the primary root. Includes grains where the primary root has been knocked off during the harvesting or handling process.



Hail Damaged

Definition: Damage to the seed coat or kernel. Damage to the seed coat can appear as bruising (darkening) or in more severe cases splitting of the seed coat. This may cause discolouration and damage to the kernel. Damage to the kernel can vary from bruising (darkening) to physical damage such as crushing of the entire kernel.



Sound Chickpea

Section 6.4 - DESI CHICKPEAS: Common Defects

Issued: 1st August 2015

Mouldy and Caked

Definition: Mould is usually indicated by blackening or discolouration of all or part of the seed coat. Grains may be soft but may also appear hard after drying out. Fungal growth may be visibly apparent on the seed coat as a fungus of various colours. Foreign material may adhere to the seed coat and visually detract from the appearance. An Objectionable Odour must not be detected. This definition does not include Ascochyta lesions. Seed coats may be similar in appearance to Poor Colour or Bin Burnt & Heat Damaged.



Note: Not Mould.
Refer Stained and
Weather Damaged.

Green - Desi Chickpeas

Definition:

Seed Coat

Seed coat appears green. More than a slight greenish tinge must be present on the seed coat to be classified as defective.

Where any greenish tinge is present on the seed coat, it is recommended the kernel also be inspected.

Kernel

Any level of green is classified as defective.



Green Kernel

Section 6.5 - DESI CHICKPEAS: Common Defects

Issued: 1st August 2015

Poor Colour

Definition:

Seed Coat

Seed coats vary from dark brown to black. Seed coats may be similar in appearance to various other defects such as Bin Burnt & Heat Damaged, Mouldy or Stained & Weather Damaged. Stained/Weather Damaged Seed Coat is included in the definition of Poor Colour Seed Coat.

Where any poor colour is present on the seed coat, it is recommended the kernel also be inspected.



All of the above depicted photos are classified as defective. These examples are to show the different colour variances.

Kernel

Any level of discolouration on the kernel is classified as defective.



Note: above grain is not Poor Colour Kernel, but is Poor Colour Seed Coat

Section 7

KABULI CHICKPEAS: Common Defects



Sound Seed



Section 7.1 - KABULI CHICKPEAS: Common Defects

Issued: 1st August 2015

Poor Colour - Seed Coat

Definition: Seed coats vary from dark brown to black. Seed coats may be similar in appearance to various other defects such as Bin Burnt & Heat Damaged, Mouldy or Stained & Weather Damaged. Where any poor colour is present on the seed coat, it is recommended the kernel also be inspected.



Sound Seed

Insect Damaged

Definition: These are grains eaten in part by Stored Grain Insects and any field pest of grains including *Heliothis spp.*

Note: Any visible insect damage to the grain is to be classified as defective



Section 7.2 - KABULI CHICKPEAS: Common Defects

Issued: 1st August 2015

Broken, Chipped, Loose Seed Coat and Split

Definition: Breakage, cracking, peeling or splitting of the seed coat or chipping and splitting of the kernel in various forms as follows.

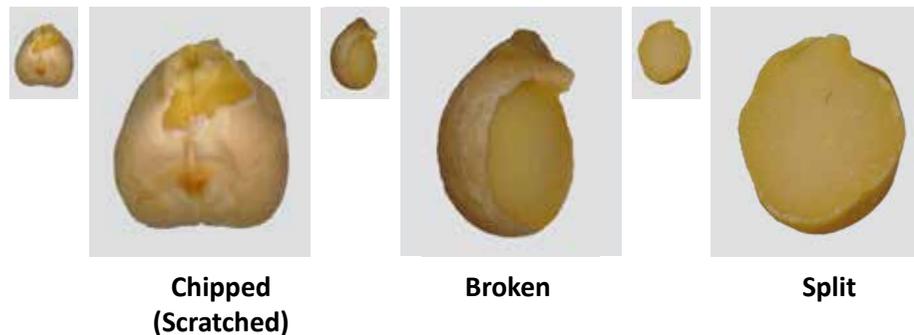
Seed Coat:

- Split Seed Coat- A split in the seed coat running more than half the entire length or across the entire width on one or both sides.
- Skin Damaged- A hole in the seed coat where more than 20% of the seed coat on any one side is missing.
- Loose Seed Coat (Peeling)- Where the seed coat is visibly falling off the kernel to any extent and not adhering tightly to the kernel.
- Missing Seed Coat- Where the entire seed coat is missing but the kernel remains intact.



Kernel:

- Chipped (Scratched) – A part of the kernel is damaged or removed.
- Broken- A split kernel with the seed coat still attached.
- Split – A split kernel with no seed coat attached



Section 7.3 - KABULI CHICKPEAS: Common Defects

Issued: 1st August 2015

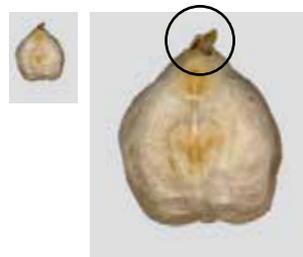
Mouldy and Caked

Definition: Mould is usually indicated by blackening or discolouration of all or part of the seed coat or kernel. Grains may be soft but may also appear hard after drying out. Fungal growth may be visibly apparent on the seed coat or kernel as a fungus of various colours. Foreign material may adhere to the seed coat and visually detract from the appearance. An Objectionable Odour must not be detected. This definition does not include Ascochyta lesions. Seed coats or kernels may be similar in appearance to Poor Colour or Bin Burnt & Heat Damaged.



Sprouted

Definition: The seed coat has split and the primary root has emerged. This includes early and any further advanced stage of growth of the primary root. Includes grains where the primary root has been knocked off during the harvesting or handling process.



Frost Damaged, Shrivelled and Wrinkled

Definition: Visible damage to the seed coat or size and shape of grain whereby the grains are severely distorted and/or shrunk. Seed coats may tightly adhere to the kernel or be brittle. Seed coats may show a level of discolouration depending on the extent of damage. Grains are often smaller than the majority in the sample.



Sound Seed

Defective Seed

Section 8

FEED MAIZE: Common Defects



Feed Maize



Section 8.1 - FEED MAIZE: Common Defects

Issued: 1st August 2015

Heat Damaged / Bin Burnt

Definition: Heat damaged or bin burnt refers to those kernels that have become discoloured due to exposure to severe heat during storage or an incorrect artificial drying technique. Affected grains appear reddish brown, or in severe cases, blackened. Heat Damaged is included in the definition of Damaged.



Sound Grain

Insect Damaged

Definition: These are grains eaten in part by Stored Grain Insects and any field pest of grains including *Heliothis spp.*

Note: Any visible insect damage to the grain is to be classified as defective.



Broken

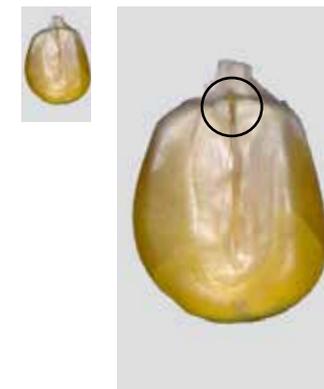
Definition: Refers to grain that is mechanically damaged due to the harvesting or handling process with a quarter or more of the grain missing. This includes any mechanical damage to the germ.



Sound Grain

Sprouted

Definition: Sprouted grains are those in which the covering of the germ is split and the shoot has broken through the seed coat. Grains that have had the germ knocked off or scalloped out due to header damage are not included. Sprouted is included in the definition of Damaged.



Section 8.2 - FEED MAIZE: Common Defects

Issued: 1st August 2015

Storage Mould

Definition: Storage Mould refers to kernels that have become affected by the development of fungi or bacteria due to an increase in grain moisture levels during storage. Affected grains appear discoloured and visibly affected by mould.

Note that if any musty odour is detected a nil tolerance applies.



Dead

Definition: Dead grains are those that have been affected by disease and appear greater than approximately 50% opaque. Grains that are equal to or less than approximately 50% opaque are considered normal grains.



Fusarium Infection

Definition/s:

Silk Cut

Easily identified where the pericarp is split and the starch appears to be popping out of the kernel.

Starburst

Best identified as spider web like streaks radiating down the kernel from the point of silk attachment. These streaks are corroded channels within the pericarp caused by fungal growth. Air in the channels breaks the transparency of the pericarp so the yellow aleurone beneath cannot be seen.



Silk Cut

Star Burst

Section 8.3 - FEED MAIZE: Common Defects

Issued: 1st August 2015

Pickling Compounds or Artificial Colouring

Definition:

Artificial Colouring

This includes grain containing an artificial colouring agent. A common contaminant is marker dyes used during crop spraying operations that has stained the maize.

Pickling Compounds

Pickling Compounds are those chemicals added to grain as a seed treatment or as a seed dressing prior to sowing. They are usually associated with a colouring agent.

Grains contaminated in this way may be identified by an unnatural surface colour and/or colour that rubs off.

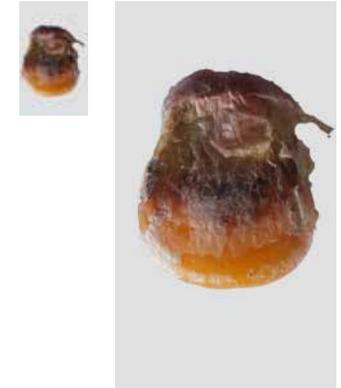
Any grains that are artificially coloured regardless of intensity are defective.



Field Fungi

Definition: Field Fungi refers to individual kernels where the seed coat is greater than approximately 50% discoloured. The visible discolouration of affected grains can vary from dark grey, brown to black in colour.

Field Fungi is included in the definition of Damaged.



Kernel Red Streak

Definition: A genetic pre-disposition some varieties have which show some red streaking in the pigment.

Note: This is not a defect and kernels are considered sound when identified as Kernel Red Streak.



Sound Grain

Section 9

ANGUSTIFOLIUS LUPINS: Common Defects



Lupin - Angustifolius



Lupin - Albus

Note: Albus Lupins are considered a contaminant in Angustifolius Lupins.



Section 9.1 - ANGUSTIFOLIUS LUPINS: Common Defects

Issued: 1st August 2015

Broken, Chipped, Loose Seed Coat and Split

Definition: Breakage, cracking, peeling or splitting of the seed coat or chipping and splitting of the kernel in various forms as follows.

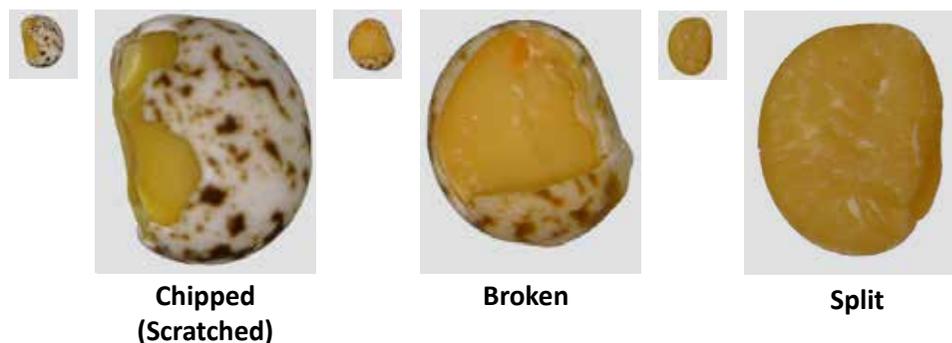
Seed Coat:

- Split Seed Coat- A split in the seed coat running more than half the entire length or across the entire width on one or both sides.
- Skin Damaged- A hole in the seed coat where more than 20% of the seed coat on any one side is missing.
- Loose Seed Coat (Peeling)- Where the seed coat is visibly falling off the kernel to any extent and not adhering tightly to the kernel.
- Missing Seed Coat- Where the entire seed coat is missing but the kernel remains intact.



Kernel:

- Chipped (Scratched) – A part of the kernel is damaged or removed.
- Broken- A split kernel with the seed coat still attached.
- Split – A split kernel with no seed coat attached



Manganese Deficiency

Definition: Splitting of the seed coat to expose the kernel. It is not considered a defect provided no damage to the exposed kernel has occurred.

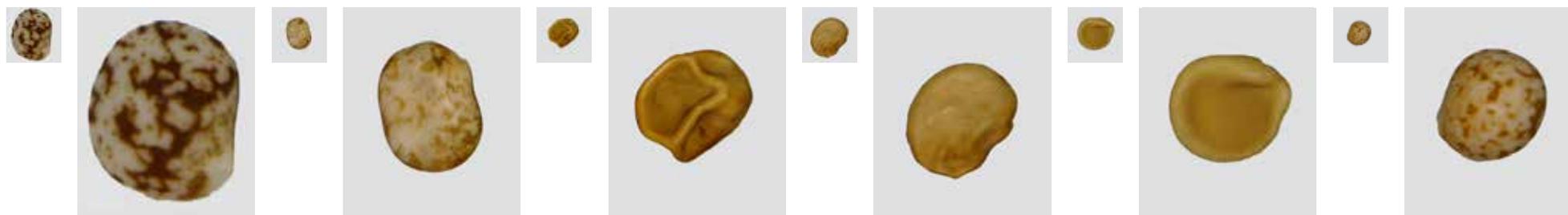


Section 9.2 - ANGUSTIFOLIUS LUPINS: Common Defects

Issued: 1st August 2015

Frost Damaged, Shrivelled and Wrinkled

Definition: Visible damage to the seed coat or size and shape of grain whereby the grains are severely distorted and/or shrunken. Seed coats may tightly adhere to the kernel or be brittle. Seed coats may show a level of discolouration depending on the extent of damage. Grains are often smaller than the majority in the sample.



Sound Lupin

Insect Damaged

Definition: These are grains eaten in part by Stored Grain Insects and any field pest of grains including *Heliothis spp.*

Note: Any visible insect damage to the grain is to be classified as defective.



Section 9.3 - ANGUSTIFOLIUS LUPINS: Common Defects

Issued: 1st August 2015

Phomopsis

Definition: Is a fungal disease that causes various agronomic and quality issues in pulses such as lupins. Grains appear sound with a fungal growth readily visible on the seed coat. If kernels are not sound, refer to Mould.



Poor Colour

Definition: Poor Colour seed coats or kernels are not considered good colour. Seed coats and kernels vary from white to dark brown/black. Seed coats and kernels may be similar in appearance to various other defects such as Bin Burnt & Heat Damaged, Mouldy, Phomopsis or Stained & Weather Damaged.



Bitter Dark

Definition: These varieties are identifiable mainly by their colour which is much darker than acceptable lupins.



Lupins may vary in colour from white to brown. Examples of Sound colour variances are below.

Acceptable colour variances:



Pickling Compounds

Definition: Pickling Compounds are chemicals added to pulses as a seed dressing or as a seed treatment prior to sowing. They are usually associated with a colouring agent.

Note: A **nil tolerance** applies to any pickling compounds, regardless of intensity or coverage.



Sprouted

Definition: The seed coat has split and the primary root has emerged. This includes early and any further advanced stage of growth of the primary root. Includes grains where the primary root has been knocked off during the harvesting or handling process.



Mouldy and Caked

Definition: Mould is usually indicated by blackening or discolouration of all or part of the seed coat or kernel. Grains may be soft but may also appear hard after drying out. Fungal growth may be visibly apparent on the seed coat or kernel as a fungus of various colours. Foreign material may adhere to the seed coat and visually detract from the appearance. An Objectionable Odour must not be detected. This definition does not include Ascochyta lesions. Seed coats or kernels may be similar in appearance to Poor Colour or Bin Burnt & Heat Damaged.



Section 10

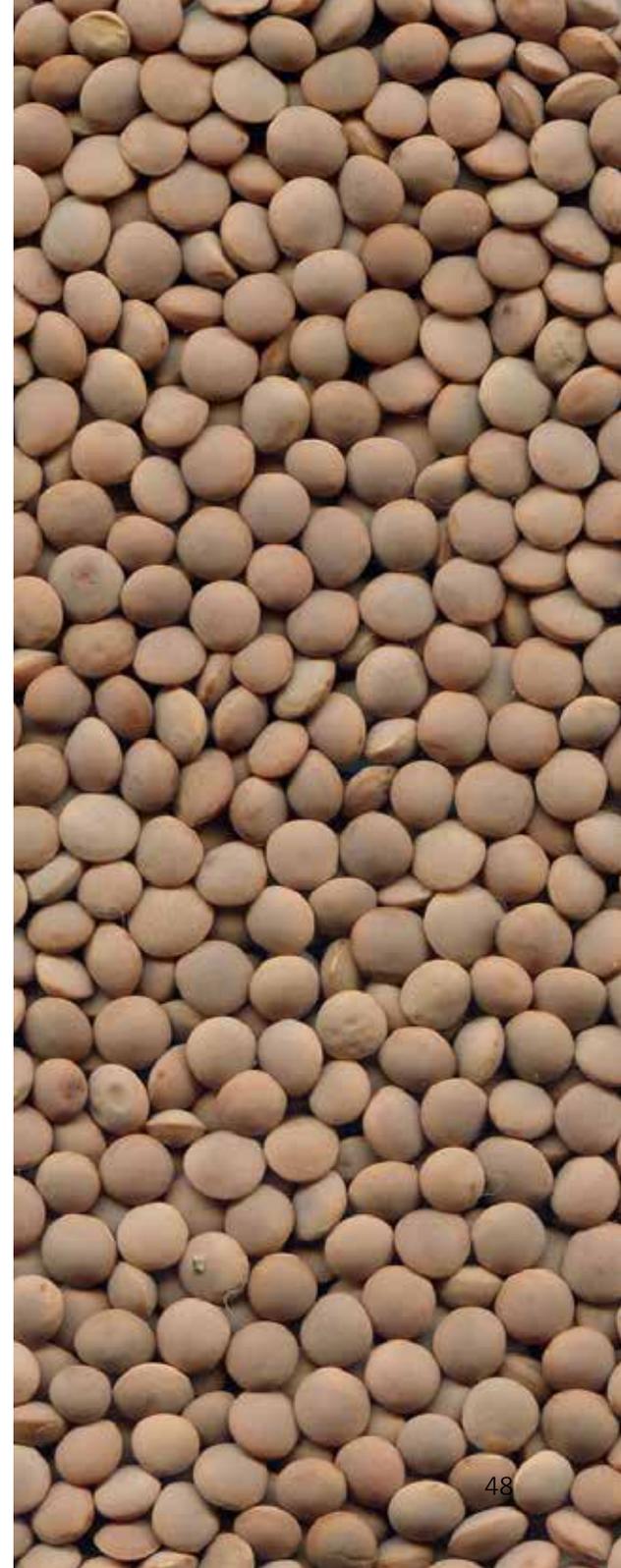
RED LENTILS: Common Defects



**Red Lentil -
Whole Seed**



**Red Lentil -
Kernel**

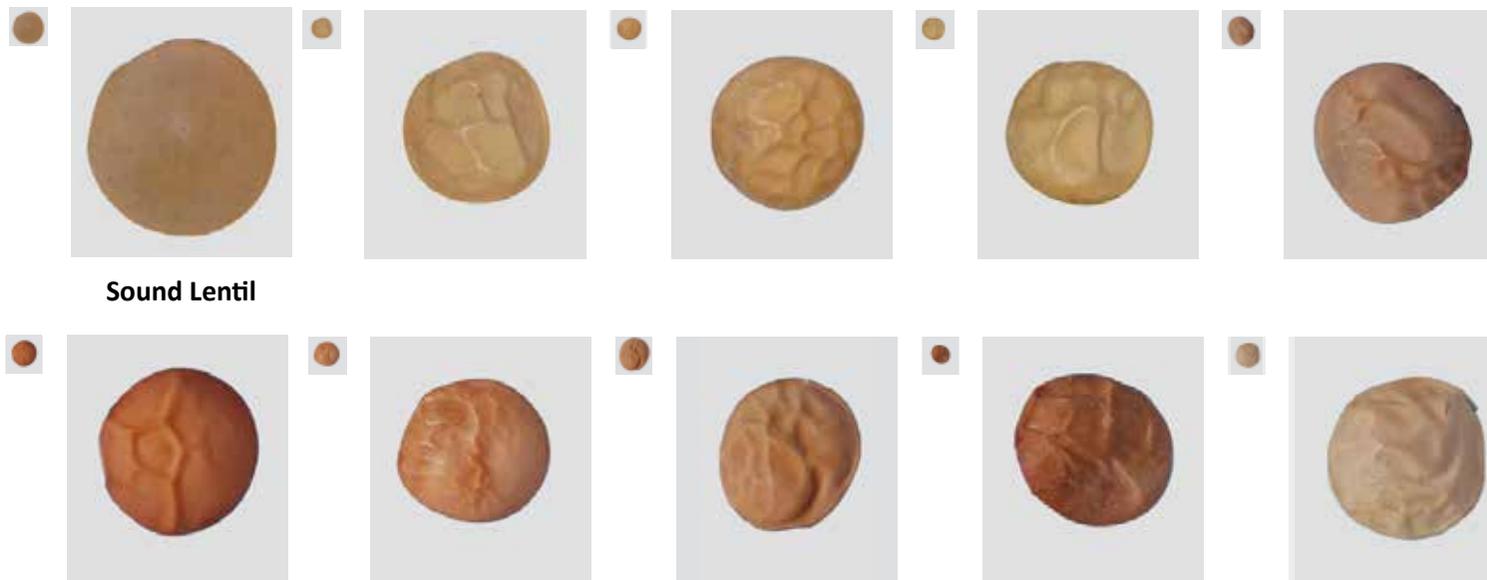


Section 10.1 - Red Lentils: Common Defects

Issued: 1st August 2015

Frost Damaged, Shrivelled and Wrinkled

Definition: Visible damage to the seed coat or size and shape of grain whereby the grains are severely distorted and/or shrunken. Seed coats may tightly adhere to the kernel or be brittle. Seed coats may show a level of discolouration depending on the extent of damage. Grains are often smaller than the majority in the sample.



Section 10.2 - Red Lentils: Common Defects

Issued: 1st August 2015

Broken, Chipped, Loose Seed Coat and Split

Definition: Breakage, cracking, peeling or splitting of the seed coat or chipping and splitting of the kernel in various forms as follows.

Seed Coat:

- Split Seed Coat- A split in the seed coat running more than half the entire length or across the entire width on one or both sides.
- Skin Damaged- A hole in the seed coat where more than 20% of the seed coat on any one side is missing.
- Loose Seed Coat (Peeling)- Where the seed coat is visibly falling off the kernel to any extent and not adhering tightly to the kernel.
- Missing Seed Coat- Where the entire seed coat is missing but the kernel remains intact.



Kernel:

- Chipped (Scratched) – A part of the kernel is damaged or removed.
- Broken- A split kernel with the seed coat still attached.
- Split – A split kernel with no seed coat attached



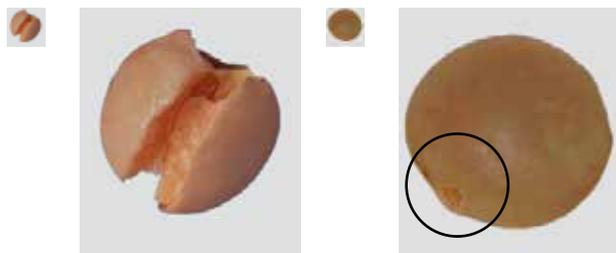
Section 10.3 - Red Lentils: Common Defects

Issued: 1st August 2015

Insect Damaged

Definition: These are grains eaten in part by Stored Grain Insects and any field pest of grains including *Heliothis spp.*

Note: Any visible insect damage to the grain is to be classified as defective.



Bin Burnt and Heat Damaged

Definition: The seed coat or kernel appears reddish-dark brown and blackened or burnt in severe cases. These grains may be similar in appearance to Poor Colour brown seeds. An Objectionable Odour must not be detected. Refer also to Mouldy & Caked.



Sound Lentil

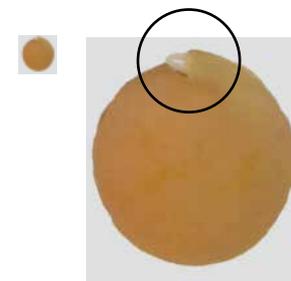
Mouldy and Caked

Definition: Mould is usually indicated by blackening or discolouration of all or part of the seed coat or kernel. Grains may be soft but may also appear hard after drying out. Fungal growth may be visibly apparent on the seed coat or kernel as a fungus of various colours. Foreign material may adhere to the seed coat and visually detract from the appearance. An Objectionable Odour must not be detected. This definition does not include *Ascochyta* lesions. Seed coats or kernels may be similar in appearance to Poor Colour or Bin Burnt & Heat Damaged.



Sprouted

Definition: The seed coat has split and the primary root has emerged. This includes early and any further advanced stage of growth of the primary root. Includes grains where the primary root has been knocked off during the harvesting or handling process

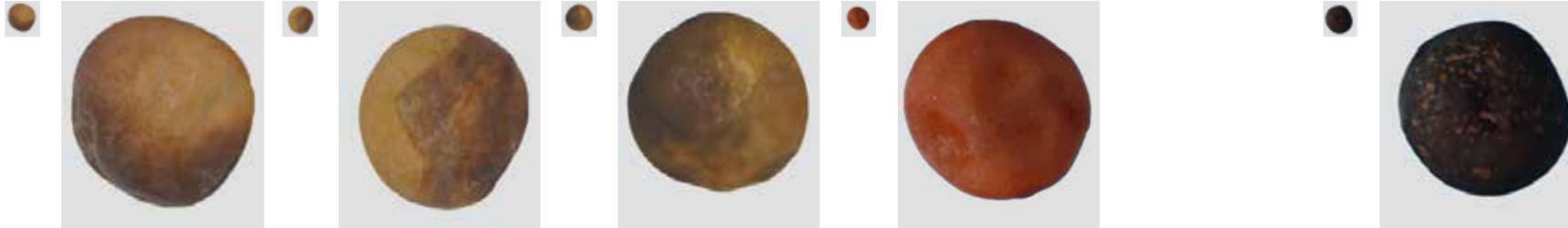


Section 10.4 - Red Lentils: Common Defects

Issued: 1st August 2015

Poor Colour Seed Coat

Definition: Poor Colour seed coats are not considered good colour. Seed coats vary from dark brown to black. Seed coats may be similar in appearance to various other defects such as Bin Burnt & Heat Damaged, Mouldy or Poor Colour (Stained & Weather Damaged).



All of the above depicted photos are classified as defective. These examples are to show the different colour variances.

Please Note: Does not include Contrasting Colour. Refer also to the definition for Contrasting Colour.

Poor Colour Kernel - Dehulled Lentil

Definition: Poor Colour refers to excessive discolouration of the kernel often depicted as a green colour. Includes any disease, frost and water staining, and green, brown, black, yellow, bleached and chalky white kernels.



Sound Lentil

Poor Colour Kernel

Poor Colour Kernel

Poor Colour Kernel

Blonde Kernel

Definition: Kernels are not uniformly orange in colour. Kernels appear yellow. Seed coat must be removed to determine the presence on the kernel.



Contrasting Colours: Lentil variety definition chart

Grains with a colour not falling within the “main and acceptable variety seed coat variation” as depicted within the GREEN section of the chart are to be classified as Contrasting Colour

PBA Blitz[Ⓟ]

Contrasting Colour	Main and acceptable variety seed coat variation						Contrasting Colour
							
Pale	Typical grey	Grey-green	Slightly marbled	Medium marbled	Strongly marbled		

PBA Herald XT[Ⓟ]

Contrasting Colour	Main and acceptable variety seed coat variation						Contrasting Colour
							
Pale	Typical grey	Grey-green	Slightly marbled	Medium marbled	Strongly marbled	Black (totally marbled)	

PBA Hurricane XT[Ⓟ]

Contrasting Colour	Main and acceptable variety seed coat variation						Contrasting Colour
							
Pale	Typical grey	Grey-green					

Aldinga

Contrasting Colour	Main and acceptable variety seed coat variation						Contrasting Colour
							
	Typical pale		Slightly marbled	Medium marbled	Strongly marbled	Grey (totally marbled)	

Section 10.6 - Red Lentils: Common Defects

Issued: 1st August 2015

Visible Ascochyta

Definition: The lesion generally appears intense dark brown to black and often fluoresces. It is commonly oval to circular and localised in nature, but may vary in shape. The lesion may be similar in colour to mould or weather damaged. The lesion may also be associated with the presence of fungal growth of various colours. A lesion may appear on one or both sides of the seed coat or kernel.

A lesion greater than 20% coverage on any one side of the seed coat is considered defective. A lesion less than 20% on any one side of the seed coat is considered sound.



Stained and Weather Damaged

Definition: A general term used to describe visible damage to the seed coat that may or may not otherwise be defined or be distinguishable from other defects in the Standards. Seed coats may be discoloured or altered in size or shape. Weather damage may also lead to Loose Seed Coat, Shrivelled and Wrinkled.

Discolouration is generally dark brown to black colour and must be greater than 20% of the surface area on any one side of the seed coat.

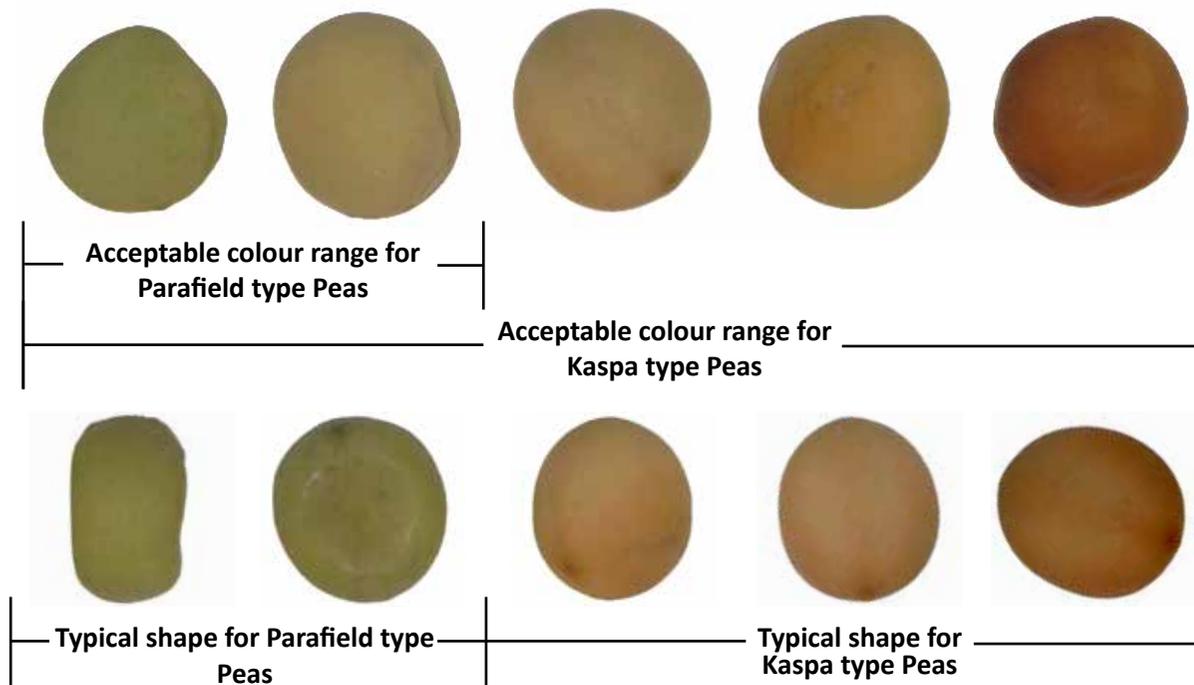


All of the above depicted photos are classified as defective. These examples are to show the different colour variances.

**Speckled
Sound Lentil**

Section 11

FIELD PEAS: Common Defects



Section 11.1 - Field Peas: Common Defects

Issued: 1st August 2015

Bin Burnt / Heat Damaged

Definition: The seed coat appears reddish-dark brown and blackened or burnt in severe cases. These grains may be similar in appearance to Poor Colour brown seeds. An Objectionable Odour must not be detected. Refer also to Mouldy & Caked.



Sound Field Pea

Insect Damaged

Definition: These are grains eaten in part by Stored Grain Insects and any field pest of grains including *Heliothis spp.*

Note: Any visible insect damage to the grain is to be classified as defective.



Mouldy and Caked

Definition: Mould is usually indicated by blackening or discolouration of all or part of the seed coat or kernel. Grains may be soft but may also appear hard after drying out. Fungal growth may be visibly apparent on the seed coat or kernel as a fungus of various colours. Foreign material may adhere to the seed coat and visually detract from the appearance. An Objectionable Odour must not be detected. This definition does not include *Ascochyta* lesions. Seed coats or kernels may be similar in appearance to Poor Colour or Bin Burnt & Heat Damaged.



Section 11.2 - Field Peas: Common Defects

Issued: 1st August 2015

Broken, Chipped, Loose Seed Coat and Split

Definition: Breakage, cracking, peeling or splitting of the seed coat or chipping and splitting of the kernel in various forms as follows.

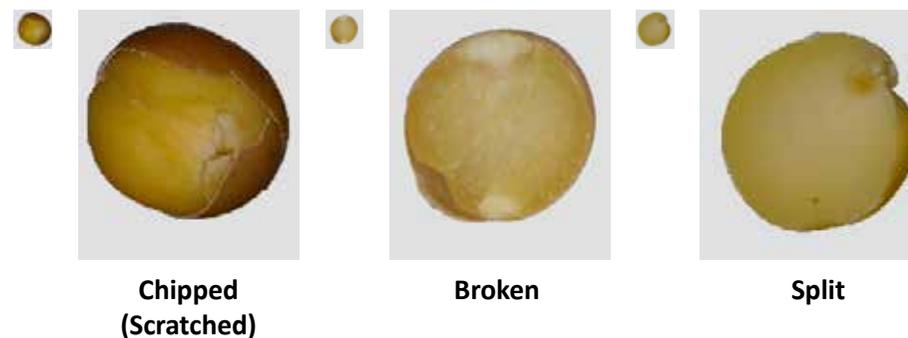
Seed Coat:

- Split Seed Coat- A split in the seed coat running more than half the entire length or across the entire width on one or both sides.
- Skin Damaged- A hole in the seed coat where more than 20% of the seed coat on any one side is missing.
- Loose Seed Coat (Peeling)- Where the seed coat is visibly falling off the kernel to any extent and not adhering tightly to the kernel.
- Missing Seed Coat- Where the entire seed coat is missing but the kernel remains intact.



Kernel:

- Chipped (Scratched) – A part of the kernel is damaged or removed.
- Broken- A split kernel with the seed coat still attached.
- Split – A split kernel with no seed coat attached.



Section 11.3 - Field Peas: Common Defects

Issued: 1st August 2015

Frost Damaged, Shrivelled and Wrinkled

Definition: Visible damage to the seed coat or size and shape of grain whereby the grains are severely distorted and/or shrunken. Seed coats may tightly adhere to the kernel or be brittle. Seed coats may show a level of discolouration depending on the extent of damage. Grains are often smaller than the majority in the sample.



Sound Field Pea

Sprouted

Definition: The seed coat has split and the primary root has emerged. This includes early and any further advanced stage of growth of the primary root. Includes grains where the primary root has been knocked off during the harvesting or handling process.



Section 11.4 - Field Peas: Common Defects

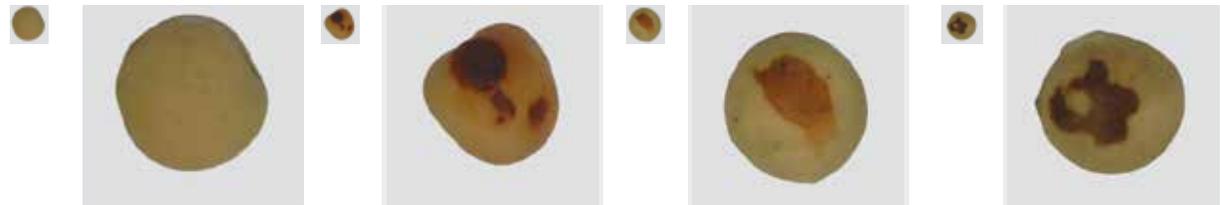
Issued: 1st August 2015

Poor Colour

Definition:

Seed Coat

Seed coats vary from dark brown to black. Seed coats may be similar in appearance to various other defects such as Bin Burnt & Heat Damaged, Mouldy or Stained & Weather Damaged. Where any poor colour is present on the seed coat, it is recommended the kernel also be inspected.



Sound Field Pea

All of the above depicted photos are classified as defective. These examples are to show the different colour variances.

Kernel

Any level of discolouration on the kernel is classified as defective. Where green kernels exist, the level of green colouring classified as defective is shown in the photos below.



Sound Kernel

All of the above depicted photos are classified as defective. These examples are to show the different colour variances.

Section 12

FABA BEANS: Common Defects



Sound Faba Bean



Section 12.1 - Faba Beans: Common Defects

Issued: 1st August 2015

Bin Burnt and Heat Damaged

Definition: The seed coat appears reddish-dark brown and blackened or burnt in severe cases. These grains may be similar in appearance to Poor Colour brown seeds. An Objectionable Odour must not be detected. Refer also to Mouldy & Caked.



Sound Faba Bean



Ascochyta

Definition: The lesion generally appears intense dark brown to black and often fluoresces. It is commonly oval to circular and localised in nature, but may vary in shape. The lesion may be similar in colour to mould or weather damaged. The lesion may also be associated with the presence of fungal growth of various colours. A lesion may appear on one or both sides of the seed coat or kernel.

A lesion greater than 20% coverage on any one side of the seed coat is considered defective. A lesion less than 20% on any one side of the seed coat is considered sound.



Section 12.2 - Faba Beans: Common Defects

Issued: 1st August 2015

Mouldy and Caked

Definition: Mould is usually indicated by blackening or discolouration of all or part of the seed coat or kernel. Grains may be soft but may also appear hard after drying out. Fungal growth may be visibly apparent on the seed coat or kernel as a fungus of various colours. Foreign material may adhere to the seed coat and visually detract from the appearance. An Objectionable Odour must not be detected. This definition does not include Ascochyta lesions. Seed coats or kernels may be similar in appearance to Poor Colour or Bin Burnt & Heat Damaged.



Sound Faba Bean

Sprouted

Definition: The seed coat has split and the primary root has emerged. This includes early and any further advanced stage of growth of the primary root. Includes grains where the primary root has been knocked off during the harvesting or handling process.



Insect Damaged

Definition: These are grains eaten in part by Stored Grain Insects and any field pest of grains including *Heliothis spp.*

Note: Any visible insect damage to the grain is to be classified as defective.



Section 12.3 - Faba Beans: Common Defects

Issued: 1st August 2015

Broken, Chipped, Loose Seed Coat and Split

Definition: Breakage, cracking, peeling or splitting of the seed coat or chipping and splitting of the kernel in various forms as follows.

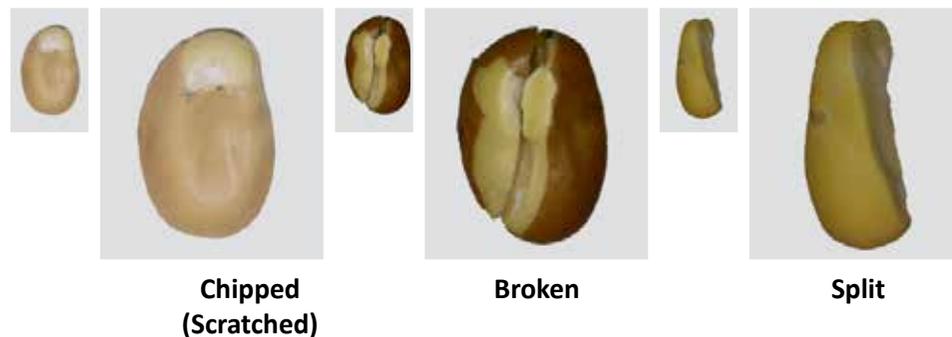
Seed Coat:

- Split Seed Coat- A split in the seed coat running more than half the entire length or across the entire width on one or both sides.
- Skin Damaged- A hole in the seed coat where more than 20% of the seed coat on any one side is missing.
- Loose Seed Coat (Peeling)- Where the seed coat is visibly falling off the kernel to any extent and not adhering tightly to the kernel.
- Missing Seed Coat- Where the entire seed coat is missing but the kernel remains intact.



Kernel:

- Chipped (Scratched) – A part of the kernel is damaged or removed.
- Broken- A split kernel with the seed coat still attached.
- Split – A split kernel with no seed coat attached.



Section 12.4 - Faba Beans: Common Defects

Issued: 1st August 2015

Frost Damaged, Shrivelled and Wrinkled

Definition: Visible damage to the seed coat or size and shape of grain whereby the grains are severely distorted and/or shrunk. Seed coats may tightly adhere to the kernel or be brittle. Seed coats may show a level of discolouration depending on the extent of damage. Grains are often smaller than the majority in the sample.



Sound Faba Bean

Frost Damaged/Stained

Definition: These grains represent Frost impacting on the grain resulting in staining on the kernel. Any level of stained on the kernel, as a result of frost, is classified as defective. Where staining does not occur on the kernel, but results in Staining only on the Seed Coat, refer to the Poor Colour definition.



Sound Faba Bean

Section 12.5 - Faba Beans: Common Defects

Issued: 1st August 2015

Poor Colour

Definition: Seed coats vary from grey, dark brown to black. Seed coats may be similar in appearance to various other defects such as Bin Burnt & Heat Damaged, Mouldy or Stained & Weather Damaged.

The photos below depict the minimum requirement of any colour to be classified as defective.



Sound Faba Bean

Pea Seed Borne Mosaic Virus

Definition: Staining on the seed coat caused by the Pea Seed Borne Mosaic Virus.



Sound Grain

Sound Grain

Sound Grain



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