GTA

Visual Recognition Standards Guide

FOR GRAIN COMMODITY SAMPLING & ASSESSMENT

Visual Recognition Standards Guide Issued 20 June 13

Grain Trade Australia (GTA)

These photographs and illustrations are produced as a set of visual standards for the purpose of facilitating the trading of commodities depicted within Australia.

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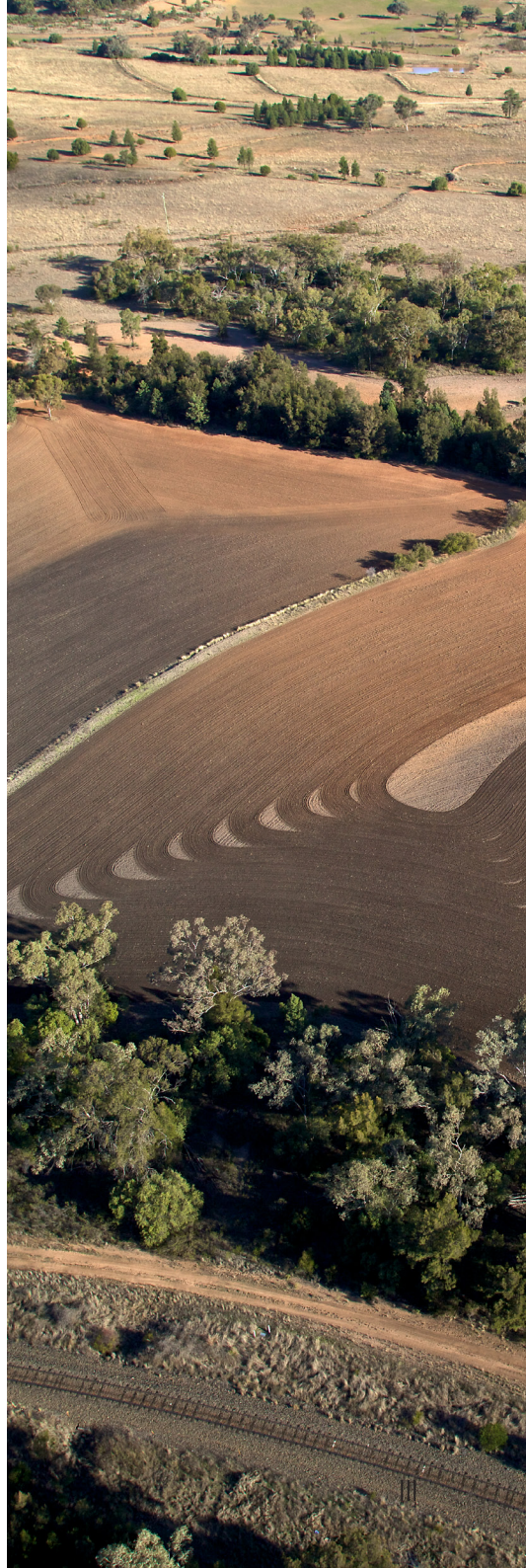
The photographs and illustrations reproduced in this Guide are produced to supplement the Grain Trade Australia Commodity Standards and for the purpose of facilitating the trade of the depicted commodities, within Australia.

Designed by BLVB



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Introduction

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.

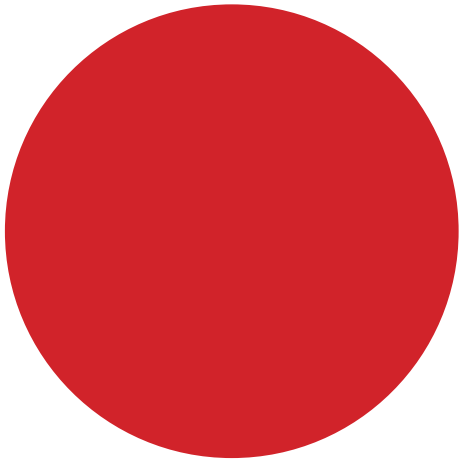
Pictures shown at this size are an approximate size of the original grain only.

These pictures are enlarged to assist in illustration of the defect.

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.

Document Calibration

Issued: 20 June 2013



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Minolta Value:
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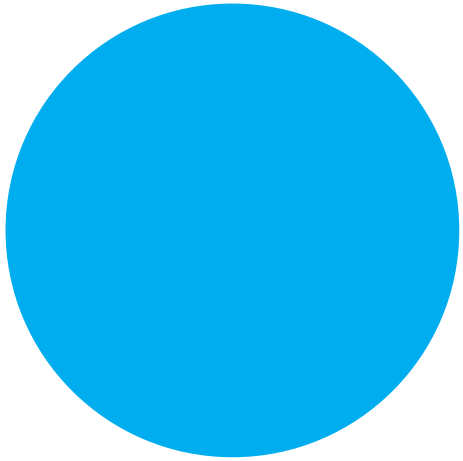

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Minolta Value:
L= 87.53 a= -10.50 b= +80.56

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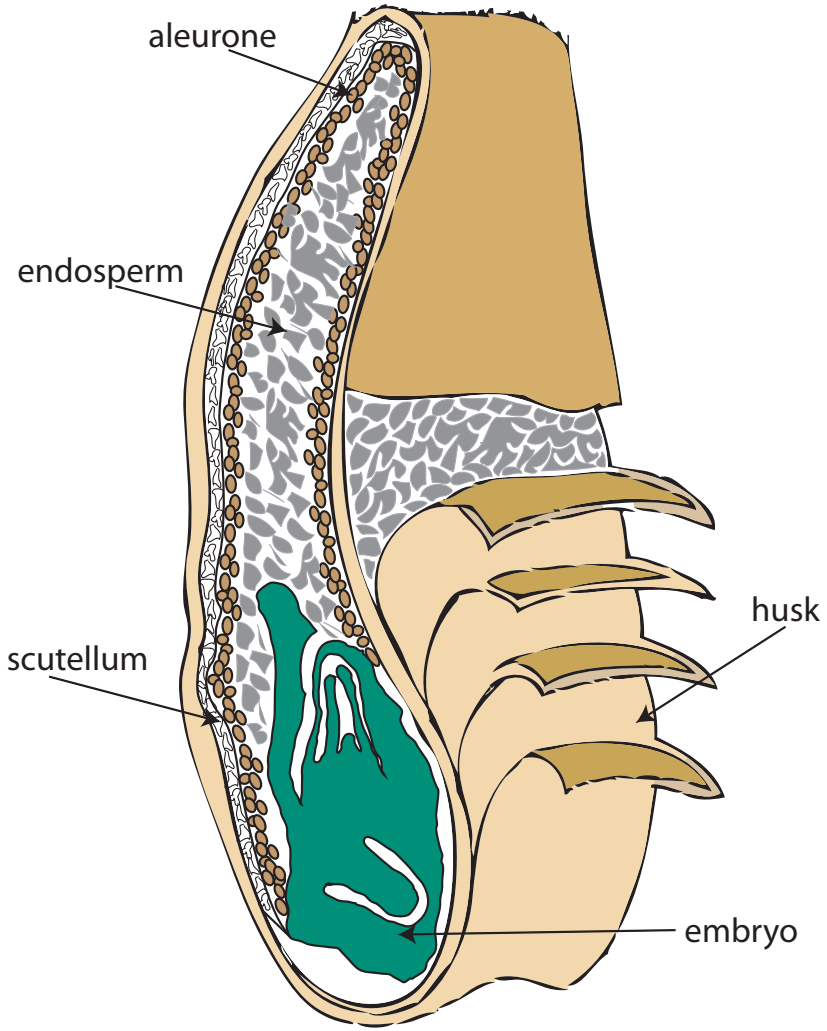
Section 1
BARLEY: Common Defects



Barley Grain

Section 1.1 - Varietal Identification: Barley

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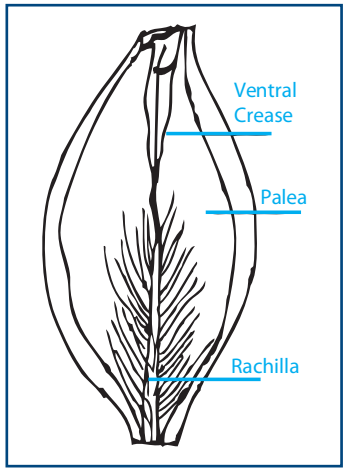
Definition: The main characteristic used in identifying barley varieties is the length of the hairs on the Rachilla. The Rachilla is white in colour and found running along the grain furrow from the germ end. There are two main types of Rachilla hair length, that being long hairs, and short woolly hairs.

Long

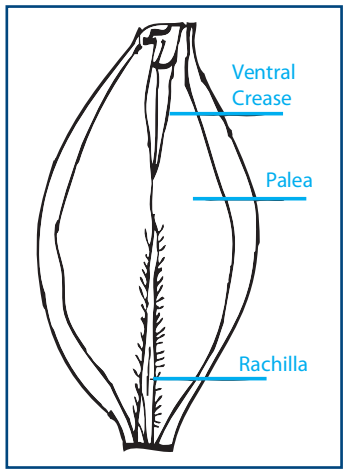


Long

Common Varieties including:

Bass, Baudin, Buloke, Dhow, Fairview, Fitzroy, Flagship, Flinders, Grange, Grout, Hamelin, Henley, Navigator, Scope, Shepherd, Skiff, Skipper, Tallon, Vlamingh, Wimmera

Short



Short

Common Varieties including:

Arapiles, Barque, Chebec, Commander, Fitzgerald, Forrest, Gairdner, Galleon, Grimmett, Hindmarsh, Maritime, 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: 20 June 2013

Defect Type: Sprouted

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

Defect Type: 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.

"tram lines"

Defect Type: Dark Tipped - (WA: Germ End Staining)

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 discolouration. 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.

Defect Type: Field Fungi - (WA: Spotted Mould Affected Barley)

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: 20 June 2013

Defect Type: Skinnings

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: 20 June 2013

Defect Type: 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.

Defect Type: 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.

Dorsal

Side

Defect Type: 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.

Ventral (Front)

Dorsal (back)

Side

Section 1.5 - Barley: Common Defects

Issued: 20 June 2013

Defect Type: 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.

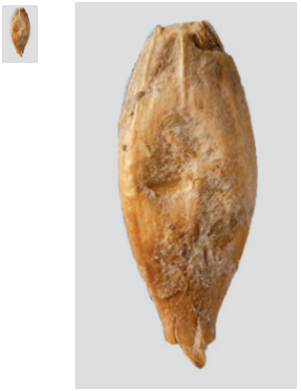
Defect Type: Heat Damaged, Bin Burnt

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.

Defect Type: Storage Mould

Definition: Storage Mould Affected 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.

The above defective grains may become damaged to the extent that they may be referred to as Rotted. Rotted grains are included in the definition for Heat Damaged, Bin Burnt or Storage Mould Affected. Rotted grains are those that have become severely affected by the development of fungi or bacteria due to high moisture conditions. Individual grains appear distinctly discoloured by mould and may be swollen and soft. Affected grains may feel spongy under pressure and/or emit a mouldy odour.



Section 1.6 - Barley: Pickling

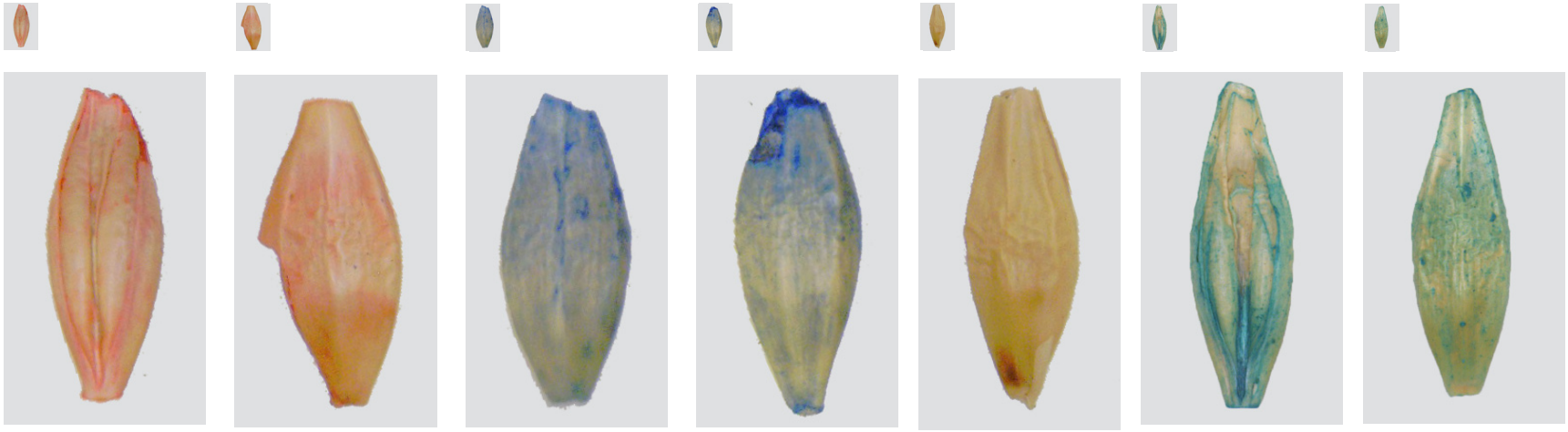
Issued: 20 June 2013

Defect Type: Pickling Compounds or Artificial Colour

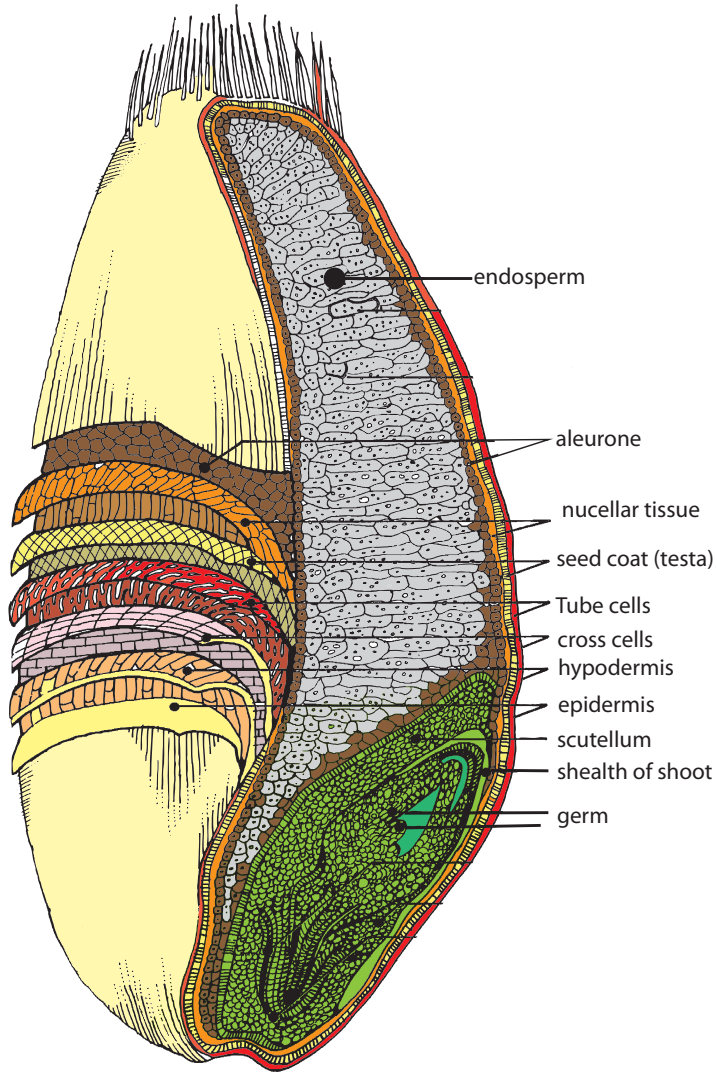
Definition: Pickling Compounds are those chemicals added to grain as a seed treatment or as a seed dressing prior to sowing. This includes grains that may be affected by marker dye commonly used during crop spraying operations that has stained the barley. They are usually associated with a colouring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

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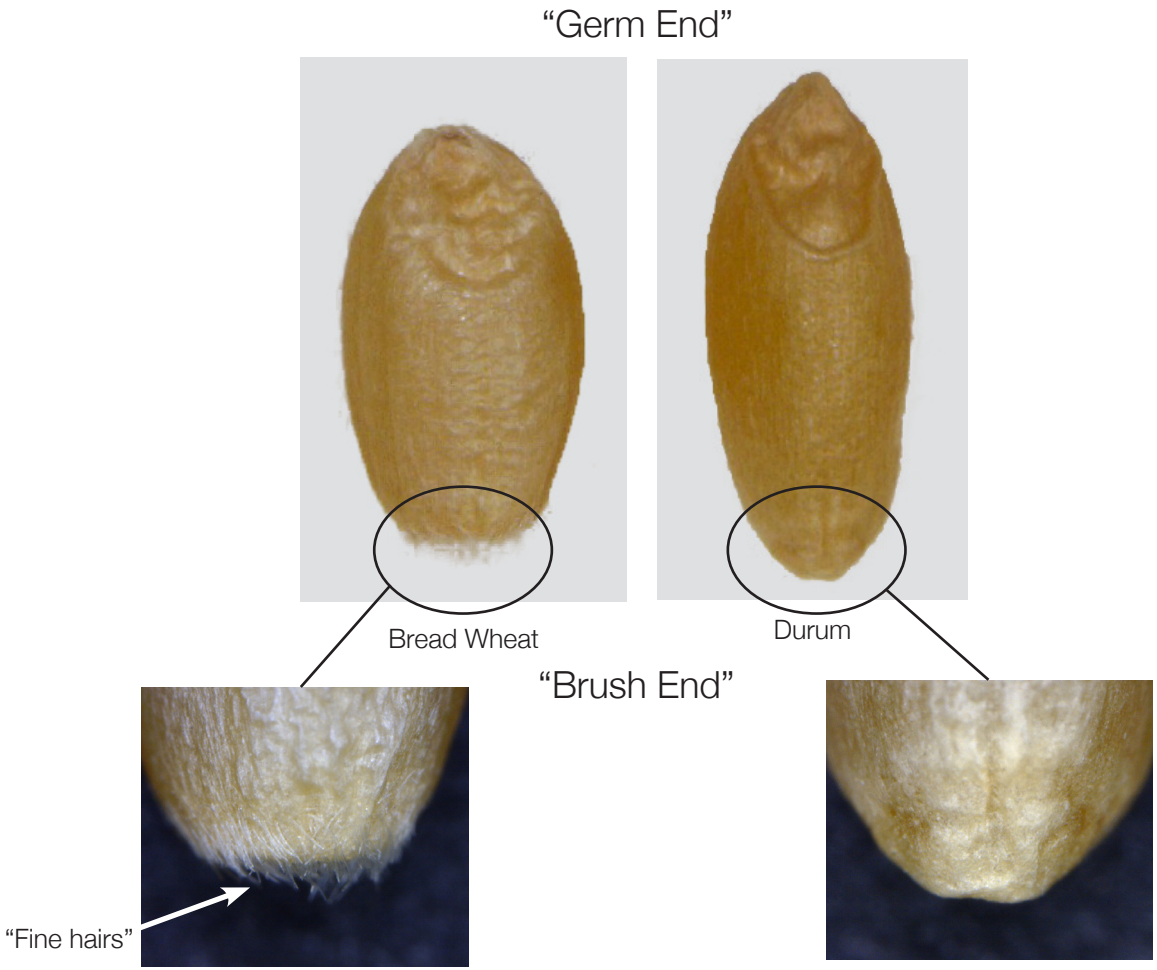
Commodity: Durum Identification from Bread Wheat

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

Defect Type: 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".

Defect Type: 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.

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: 20 June 2013

Defect Type: 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.

Defect Type: Takeall Affected

Definition: This 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.

Above 2mm screen only

Defect Type: Frost Damaged

Definition: 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.

Above 2mm screen only

Defect Type: 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: 20 June 2013

Defect Type: 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.

Defect Type: 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.

Defect Type: 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.

**photograph sourced from U. S. Department of Agriculture*

Defect Type: Storage Mould Affected

Definition: Storage Mould Affected 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: 20 June 2013

Defect Type: 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 | Bleached (not defective) | White Grain / Head Scab | White Grain/ Flaked

Note: The sound and bleached kernels are provided for contrast and are not to be considered defective.

Section 2.6 - Wheat: Common Defects

Issued: 20 June 2013

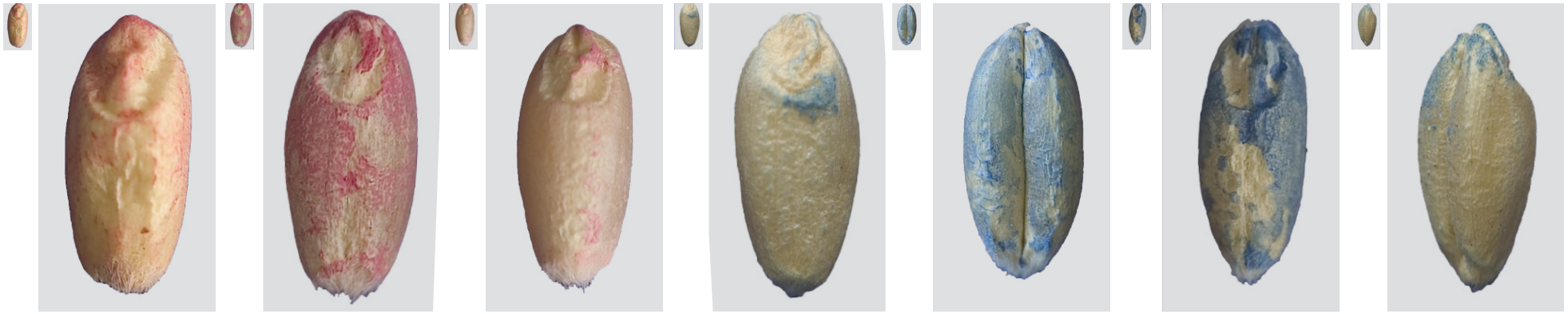
Defect Type: Ball Smuts

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.

Defect Type: Pickling Compounds or Artificial Colouring

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: 20 June 2013

Defect Type: 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.

Defect Type: 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.

Defect Type: 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.

Defect Type: 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.

**photograph sourced from U. S. Department of Agriculture*

Section 3.2 - Sorghum: Common Defects

Issued: 20 June 2013

Defect Type: Storage Mould

Definition: Storage Mould Affected 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.

Defect Type: Musty, Mouldy or Rotted

Definition: Rotted grains are those that have become severely affected by the development of fungi or bacteria due to high moisture conditions. Individual grains appear distinctly discoloured by mould and are swollen and soft. Affected grains will feel spongy under pressure and/or emit a mouldy odour.

Defect Type: 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 white, to grey to black in colour.

Defect Type: Stained

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. This discolouration may be caused by a relatively slow growing fungus that affects the appearance of the grain. It does not refer to the more serious storage moulds (refer Heat Damaged, Bin Burnt, Storage Mould Affected, Musty, Mouldy or Rotted).

The definition for Stained includes kernels that display the following:

- A distinct light grey, to dark brown to black discolouration on approximately 50% or less of the grain. The discolouration generally is not able to be rubbed off.

Kernels with greater than approximately 50% discolouration are to be classified as “Field Fungi”.

Grains that exhibit small dots covering less than approximately 5% of the surface area of the kernel (a small proportion) are not to be classified as Stained and are otherwise whole sound grains.

Section 3.3 - Sorghum: Common Defects

Issued: 20 June 2013

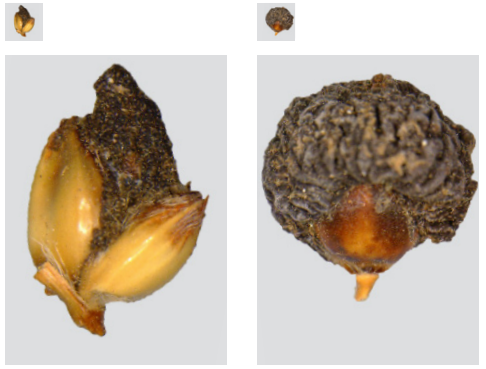
Defect Type: Honeydew

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, generally when infected with Sorghum Ergot. 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.

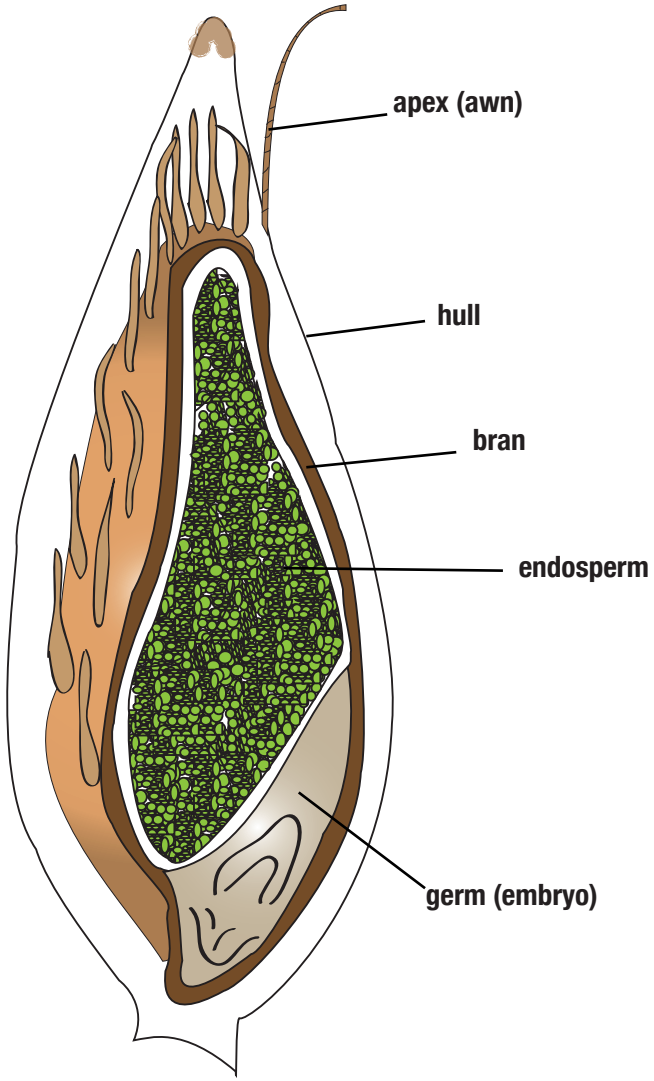
Defect Type: Sorghum Ergot

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.



Claviceps africana *Cerebella spp.*

Section 4
OATS: Common Defects



Groat

Oat

Section 4.1 - Oats: Common Defects

Issued: 20 June 2013

Defect Type: Damaged Grains

Definition: Damaged Grains are grains that have been physically damaged. Any level of damage is classified as defective. This commonly includes broken grain, occurring during the harvesting or handling process.

Defect Type: Field Fungi

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.

Defect Type: Weather Stained Grains

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.

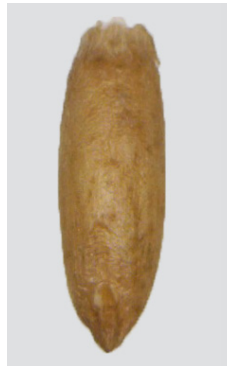
Where Weather Stained Grains are present in a sample the husk is to be removed and the Groat examined to determine if the defect is present.

Defect Type: 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: 20 June 2013

Defect Type: 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.

Defect Type: 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.

Defect Type: Dry Green or Sappy

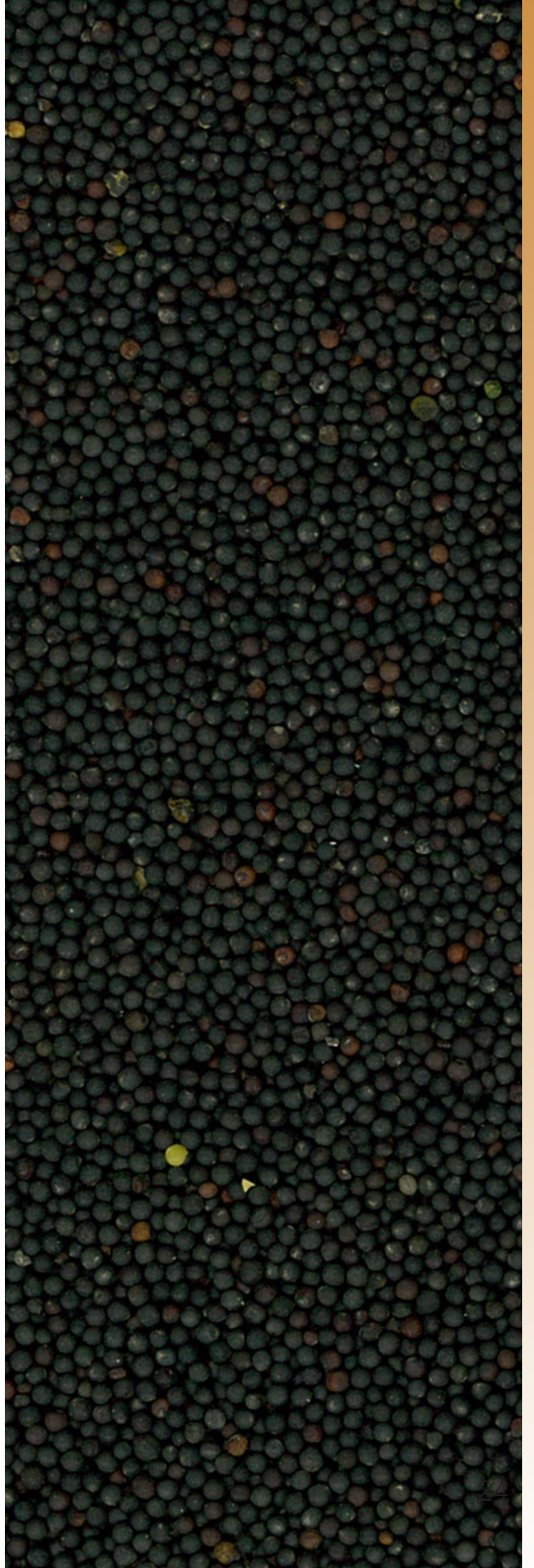
Definition: Dry Green refers to green grains arising from harvesting of grain before it has matured. Dry Green grains are those whose surface is distinctively green. Dry Green grains are usually dry and hard.

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.

Defect Type: 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



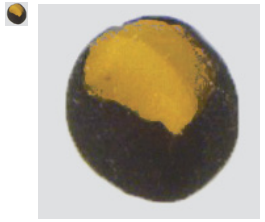
Section 5.1 - Canola: Common Defects

Issued: 20 June 2013

Defect Type: 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).

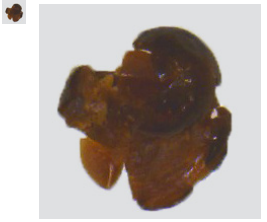
Broken or split seed is not included in the Defective Seed or Damaged seed category.



Defect Type: 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. Heated seeds may have a heated odour or a brown powdery appearance when crushed. Heat damaged is a part of Damaged seed.

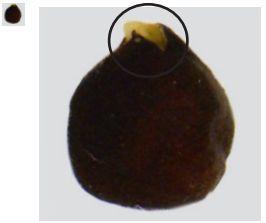
Defective Crushed Canola



Sound Crushed Canola

Defect Type: Sprouted

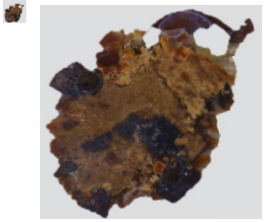
Definition: The seed coat has split and the primary root has emerged. This includes early and any further advanced stage of growth of the primary root. Includes grains where the primary root has been knocked off during the harvesting or handling process.



Defect Type: Weather Damaged

Definition: Weather damaged seeds are those that have been subjected to rain during the maturation phase. Seeds are generally recognised as having a grey washed out appearance. When crushed, they may have a chalky texture. It is often difficult to determine the difference between these grains and Weather Stained grains. Weather Damaged seeds are classified under Damaged Seeds.

Defective Crushed Canola

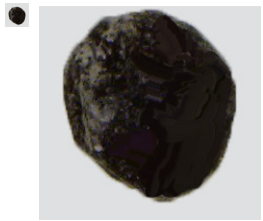


Sound Crushed Canola

Section 5.2 - Canola: Common Defects

Defect Type: Mouldy Seed

Definition: Mouldy seed refers to seed that is visibly affected by mould, fermentation and any subsequent deterioration. It is included in the category of Degraded seed.



Section 6
DESI CHICKPEAS:Common Defects

Chickpea - Desi

Section 6.1 - Desi Chickpeas: Common Defects

Issued: 20 June 2013

Defect Type: 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.

Defect Type: 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.

Defect Type: 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. Damage to the seed coat may be referred to as loose seed coat or skin damage. Damage to the kernel may be referred to as chipped or scratched.

- Skin Damaged - (i.e., a hole in the seed coat) where more than approximately 20% of the seed coat on any one side is missing (Where the entire seed coat is not present, it is often referred to as Missing Seed Coat).
- Chipped - part of the kernel is removed or damaged.
- *Loose Seed Coat (Peeling)* - Where the seed coat is visibly falling off the kernel to any extent and not adhering tightly to the kernel.
- *Broken* - is a split with the seed coat still attached.
- *Split Seed Coat* - A split in the seed coat running more than half the length or width on one or both sides.
- *Split* - where the kernel is divided into two.

Skin Damaged | Loose Seed Coat | Chipped | Broken | Split | Missing Seed coat

Section 6.2 - Desi Chickpeas: Common Defects

Issued: 20 June 2013

Defect Type: 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.

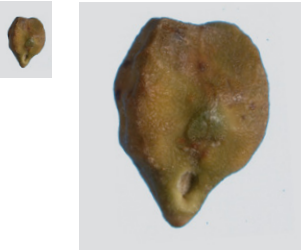
Defect Type: Hail Damaged

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.

Defect Type: Green Grains - Desi Chickpeas

Definition: Seed coats appear green. Where any greenish tinge is present on the seed coat, it is recommended the kernel also be inspected.

More than a slight greenish tinge must be present to be classified as defective.



Defect Type: 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 6.3 - Desi Chickpeas: Common Defects

Defect Type: 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.

Defect Type: Poor Colour

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 Stained & Weather Damaged.

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

Section 6.4 - Desi Chickpeas: Common Defects

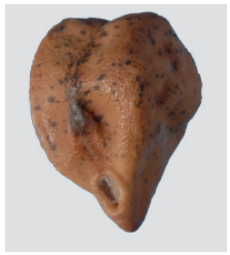
Issued: 20 June 2013

Defect Type: 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 Poor Colour, a Loose Seed Coat, Shrivelled and Wrinkled.

Defective Chickpea

Tiger Striping
Sound Chickpea



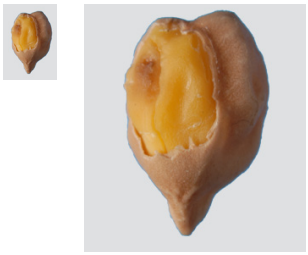
Speckled
Sound Chickpea

Defect Type: Visible Ascochyta

Definition: Lesions are generally visible to the naked eye. 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.

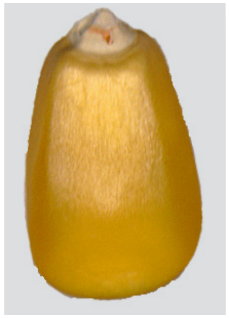
Any lesion of any size is permitted and not classified as Ascochyta provided it is not also present on the kernel. If the Ascochyta seed coat lesion is approximately >20% but does not penetrate to the kernel (and thus fall under the Ascochyta definition), then the grain is classified as Stained & Weather Damaged and is classified as defective.

Ascochyta lesion



Ascochyta lesion
on kernel

Section 7
FEED MAIZE: Common Defects



Gritting Maize

Feed Maize

Section 7.1 - Feed Maize: Common Defects

Issued: 20 June 2013

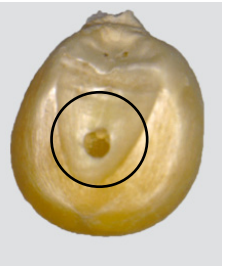
Defect Type: Heat Damaged / Bin Burnt

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.

Defect Type: 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.



Defect Type: Broken

Definition: Broken maize refers to maize that is mechanically damaged due to the harvesting or handling process. It includes any mechanical damage to the germ.

Defect Type: 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 7.2 - Feed Maize: Common Defects

Issued: 20 June 2013

Defect Type: 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. Includes the commonly referred to term Rotted.

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

Defect Type: 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.

Defect Type: Fusarium Infection

Definition:

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 7.3 - Feed Maize: Common Defects

Issued: 20 June 2013

Defect Type: Pink Stained

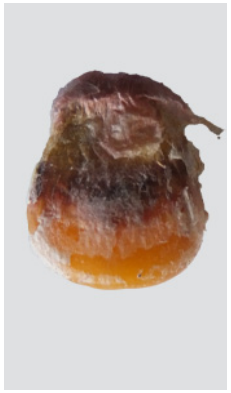
Definition: This is a grain defect arising from infection by various fungi such as *Fusarium spp* which give the seed coat a distinct pink discolouration. The pink discolouration of these grains cannot be rubbed off from the grain surface (refer Pickling Compounds or Artificial Colouring).

PHOTO TO BE CONFIRMED

Defect Type: 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.



Defect Type: 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.

Section 8
ANGUSTIFOLIUS LUPINS: Common Defects

Lupin - Angustifolius

Lupin - Albus

Section 8.1 - Angustifolius Lupins: Common Defects

Issued: 20 June 2013

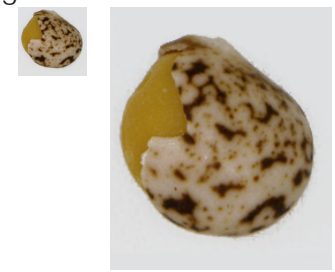
Defect Type: Broken, Chipped, Loose Seed Coat and Split

Definition: Breakage, cracking, peeling or splitting of the seed coat or chipping and splitting of the kernel in various forms. Damage to the seed coat may be referred to as loose seed coat or skin damage. Damage to the kernel may be referred to as broken or scratched.

- Missing Seedcoat - where the seedcoat is missing.
- Broken - A chip where part of the kernel is removed.
- Loose Seed Coat (Peeling) - Where the seed coat is visibly falling off the kernel to any extent and not adhering tightly to the kernel.
- Split - A Split in the seed coat running more than half the entire length or across half the entire width on one or both sides

Missing Seedcoat

Broken



Loose Seed Coat

Split

Defect Type: Frost Damaged, Shrivelled and Wrinkled

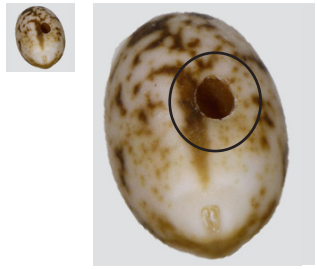
Definition: Visible damage to the seed coat or size and shape of grain whereby the grains are severely distorted and/or shrunken. Seed coats may tightly adhere to the kernel or be brittle. Seed coats may show a level of discolouration depending on the extent of damage. Grains are often smaller than the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

Sound Lupin

Defect Type: 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 8.2 - Angustifolius Lupins: Common Defects

Issued: 20 June 2013

Defect Type: Phomopsis

Definition: Is a fungal disease that causes various agronomic and quality issues in pulses such as lupins.

Defect Type: Bitter Dark

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

Defect Type: 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.

Defect Type: Poor Colour

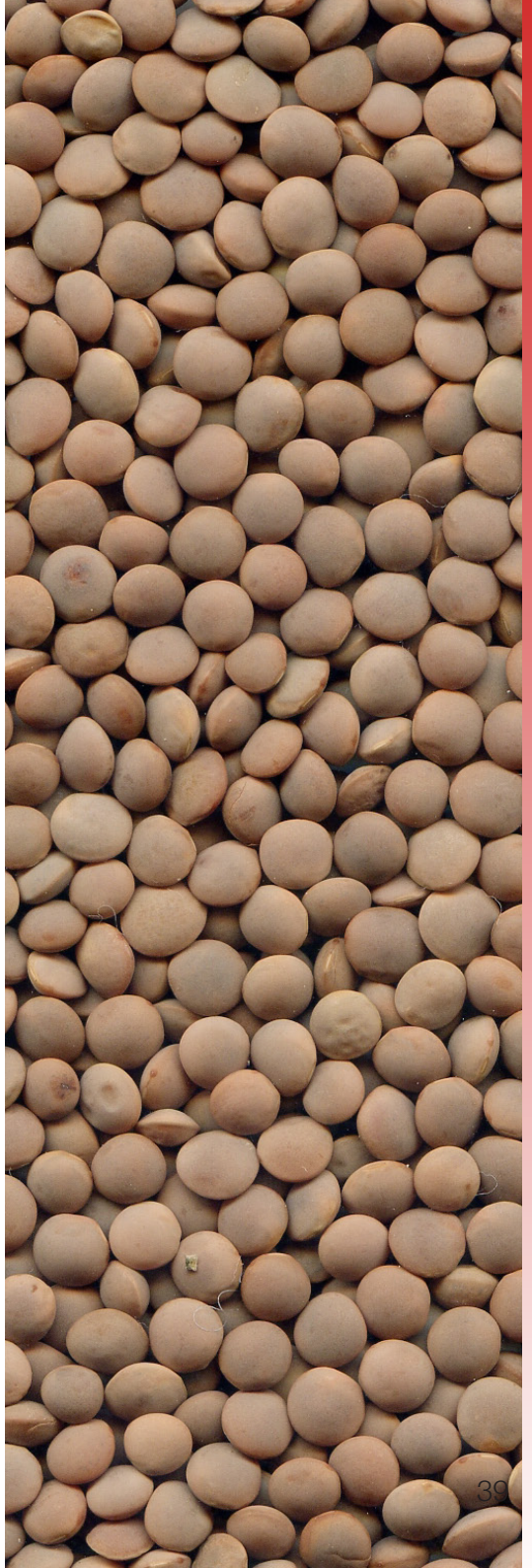
Definition: Poor Colour seed coats or kernels are not considered good colour. Seed coats and kernels vary from white to dark brown/black. Seed coats and kernels may be similar in appearance to various other defects such as Bin Burnt & Heat Damaged, Mouldy or Stained & Weather Damaged.

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

Section 9
Red Lentils: Common Defects

Red Lentil - Whole Seed

Red Lentil - Kernel



Section 9.1 - Red Lentils: Common Defects

Issued: 20 June 2013

Defect Type: 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.

Defect Type: 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. Damage to the seed coat may be referred to as loose seed coat or skin damage. Damage to the kernel may be referred to as chipped, broken or scratched.

- Skin Damaged - (i.e., a hole in the seed coat) where more than 20% of the seed coat on any one side is missing (Where the entire seed coat is not present, it is often referred to as Missing Seed Coat).
- Chipped - part of the kernel is removed or damaged.
- *Loose Seed Coat (Peeling)* - Where the seed coat is visibly falling off the kernel to any extent and not adhering tightly to the kernel.
- *Split Seed Coat* - A split in the seed coat running more than half the length or width on one or both sides.
- *Split* - where the kernel is divided into two.

Skin Damaged | Chipped | Loose Seed Coat | Split Seed Coat | Split

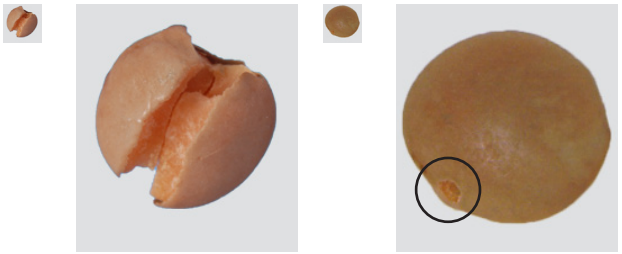
Section 9.2 - Red Lentils: Common Defects

Issued: 20 June 2013

Defect Type: 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.

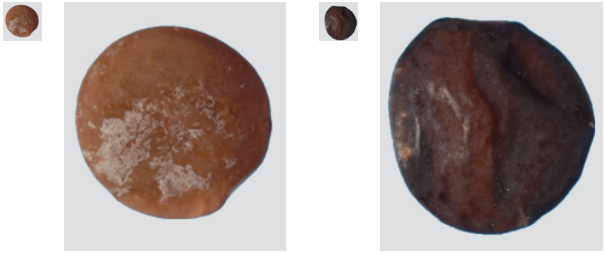


Defect Type: Bin Burnt and Heat Damaged

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.

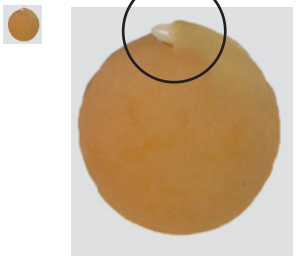
Defect Type: Mouldy and Caked

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.



Defect Type: 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 9.3 - Red Lentils: Common Defects

Issued: 20 June 2013

Defect Type: 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 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.

Defect Type: 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 - Green

The two Green Lentil photos are classified as poor colour. These examples are to show the different colour variances.

Defect Type: 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.

Issued: 20 June 2013

Contrasting Colours: Lentil variety definition chart

PBA Blitz[A]

Contrasting Colour	Main and acceptable variety seed coat variation					Contrasting Colour
						
Pale seed coat	Typical grey seed coat	Grey-green seed coat can occur with early maturity time in grey seeded lentils	Slightly marbled seed coat	Medium marbled seed coat	Strongly marbled seed coat	

PBA Herald-XT[A]

Contrasting Colour	Main and acceptable variety seed coat variation					Contrasting Colour
						
Pale seed coat	Typical grey seed coat	Grey-green seed coat can occur with early maturity time in grey seeded lentils	Slightly marbled seed coat	Medium marbled seed coat	Strongly marbled seed coat	Black seed coat (totally marbled)

Aldinga

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

Printed August 2013.

Contrasting colour is genetic variation within a variety.

Red lentils: Contrasting Colours

PULSE AUSTRALIA

Section 9.5 - Red Lentils: Common Defects

Issued: 20 June 2013

Defect Type: Visible Ascochyta

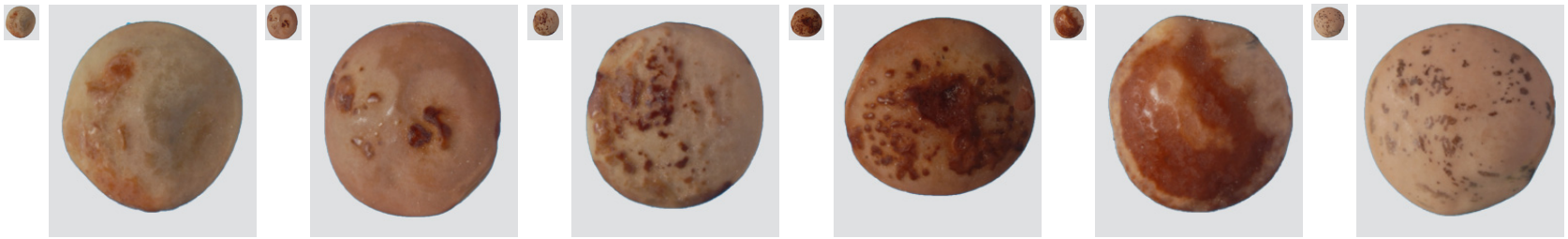
Definition: The lesion generally appears intense dark brown to black and often fluoresces. It is commonly oval to circular and localised in nature, but may vary in shape. The lesion may be similar in colour to mould or weather damaged. The lesion may also be associated with the presence of fungal growth 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.

Defect Type: 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 Poor Colour, a 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

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