



Visual Recognition Standards Guide

FOR GRAIN COMMODITY SAMPLING & ASSESSMENT

Issued 1st August 2023



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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. Unless otherwise stated, the grain defect may only appear on one side. That is, the photographs depict the minimum to be assessed as defective, and only needs to be present on one side (unless otherwise stated).



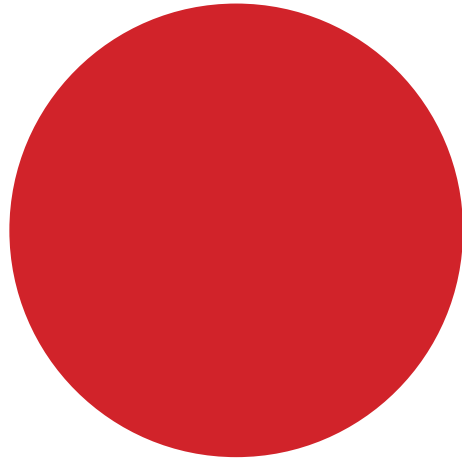
Pictures shown at this size are an approximate size of the original grain only.

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

Calibration

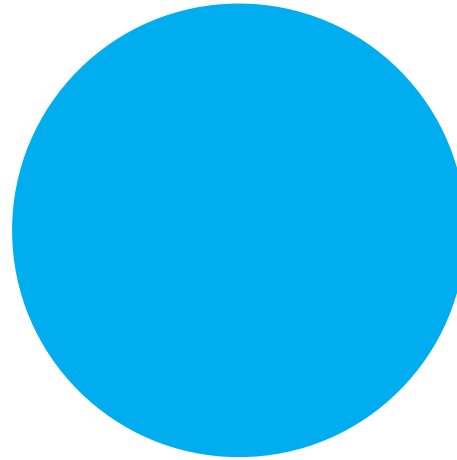
A calibration sheet is provided for those who are downloading and printing these guides. Careful calibration of these photographs is vital as monitors and printers may vary.

DOCUMENT CALIBRATION



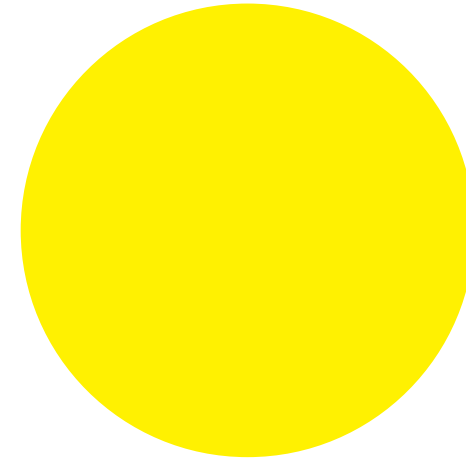
CMYK Value:
C=0 M=100 Y=0 K=0

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



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

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 Edge 5MP AM7915, 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

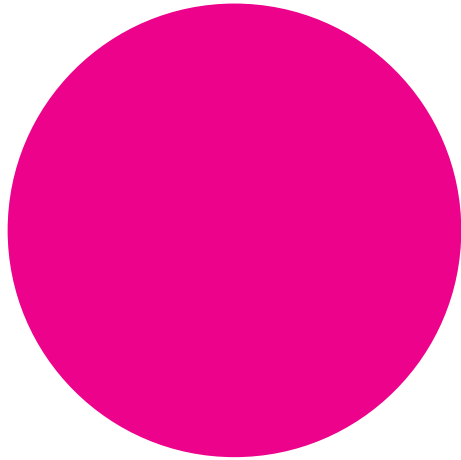
The VRSg should be viewed using a computer with digital video (DVI) output and an EIZO CG19, EIZO S1921, EIZO S1932, EIZO S1961, or EIZO CE210W display.

Paper Type for Printing: Brand: Office Elements GSM: 80gsm Colour: White

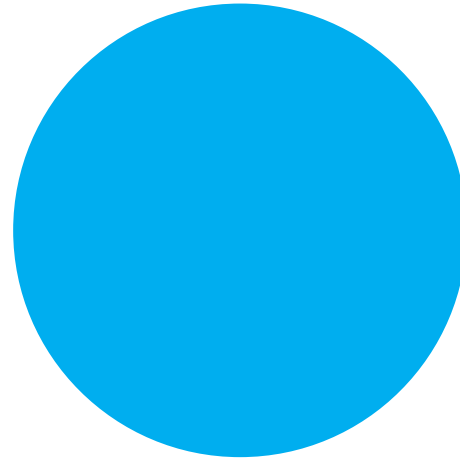
Laminate material: Brand: OfficeMax 125 Micron laminating pouches Re-Order Code: 1950630

Disclaimer: The mention of firm names or trade products does not imply that they are endorsed or recommended.

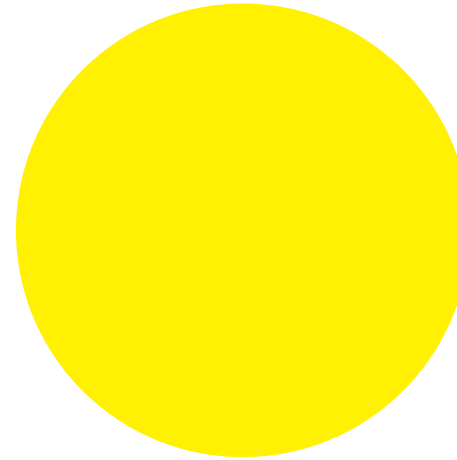
PRINTER CALIBRATION



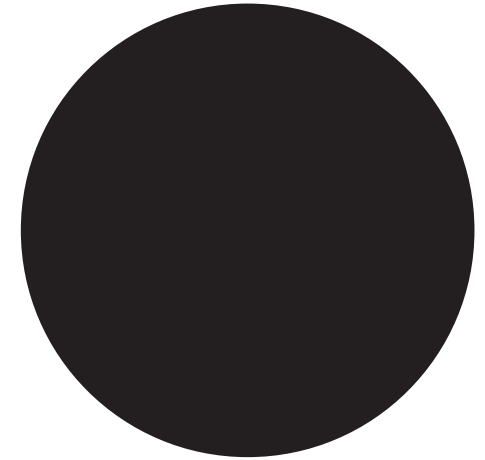
CMYK Value:
C=0 M=100 Y=0 K=0



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



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



CMYK Value:
C=75 M=68 Y=0 K=100

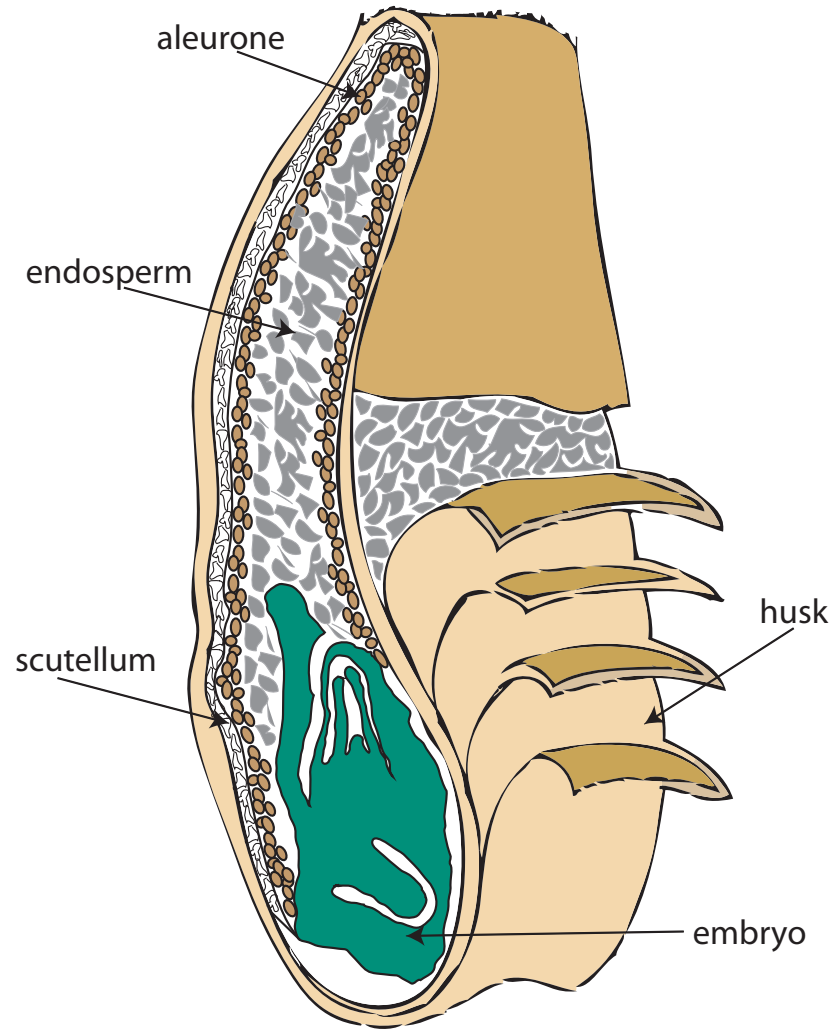
NOTE: This page is specifically for use by a commercial printer.

Paper Type for Printing: Brand: Office Elements GSM: 80gsm Colour: White

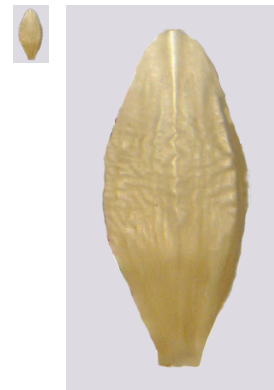
Laminate material: Brand: OfficeMax 125 Micron laminating pouches Re-Order Code: 1950630

Disclaimer: The mention of firm names or trade products does not imply that they are endorsed or recommended.

BARLEY



Barley Grain



Sound

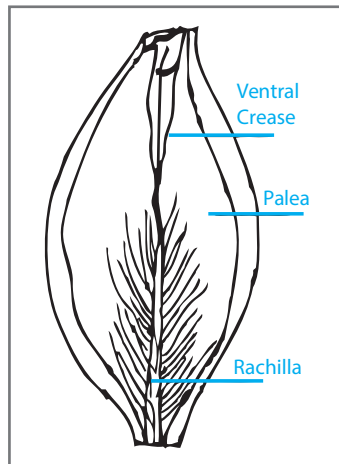


BARLEY: VARIETAL IDENTIFICATION

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, long hairs and short woolly hairs.



Long



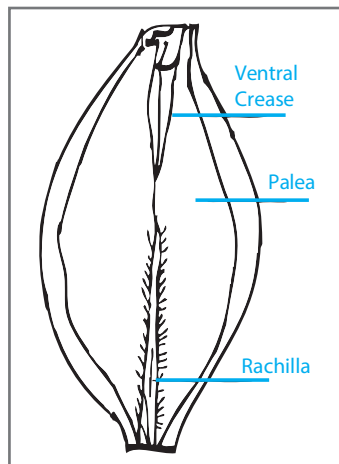
Long

Common Varieties include:

- | | |
|-------------|-------------|
| Banks | Oxford |
| Bass | Rosalind |
| Baudin | Scope (Cl.) |
| Beast (AGT) | Shepherd |
| Bottler | |
| Compass | |
| Fairview | |
| Fathom | |
| Grout | |
| Kiwi | |
| Leabrook | |
| Maximus CL | |



Short



Short

Common Varieties include:

- | | |
|-----------------|-----------------|
| Buff | Spartacus (Cl.) |
| Commander | Urambie |
| Fleet Australia | Westminster |
| Flinders | |
| Gairdner | |
| GrangeR | |
| Hindmarsh | |
| La Trobe | |
| Laperouse | |
| LG Alestar | |
| (RGT) Planet | |
| Schooner | |

Awn End of Grain



Dorsal (Back)



Ventral (Front)

Germ End of Grain



BARLEY: COMMON DEFECTS

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Sprouted

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



Side

Shot

Definition: 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 'tramlines' on both sides where the husk has begun to lift on each side on the back of the grain at the germ end.

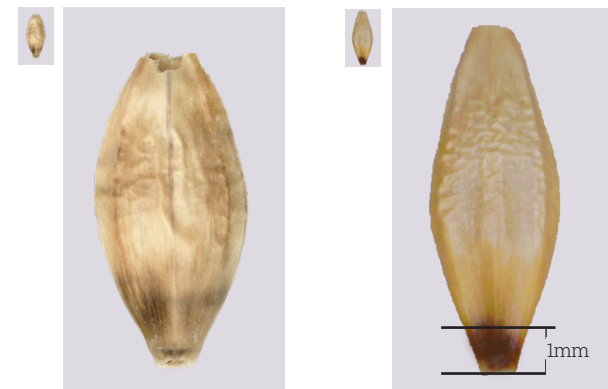


"tramlines"

Dark Tipped (Germ End Stained-WA)

Definition: Grains exhibit a distinct 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. Discolouration originating at the awn end is not Dark Tipped, refer to Severely Damaged. Dark tipping equal to or greater than 1mm is classified as defective grain.

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



Sound

Defective

BARLEY: COMMON DEFECTS

Skinnings (Skinned-WA)

Definition: Damage to the protective husk of the barley. Usually caused by mechanical damage to the grain during harvesting.

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

- Skinning - 1/3 or more of the total surface area of the husk is missing.
- 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.
- Kernels may or may not be dark under the husk.



Dorsal (Back)



Ventral (Front)



Germ Exposed



Dark Under Husk

Cleaved (front, back and side)

Definition: Refers to any damage to the grain exposing the white endosperm. Any visible cleaving is considered defective. It includes but is not limited to -

- A split along the crease or a split down the back, front or side of the grain exposing the white endosperm.
- Grains that are swollen but smaller in size than normal, are sometimes fused in groups of 2 or 3 and are split to reveal the inner endosperm (sometimes identified as hormonal damage).
- Kernels may or may not have a pink discoloration.



Ventral (Front)



Ventral (Front)



Dorsal (Back)



Side



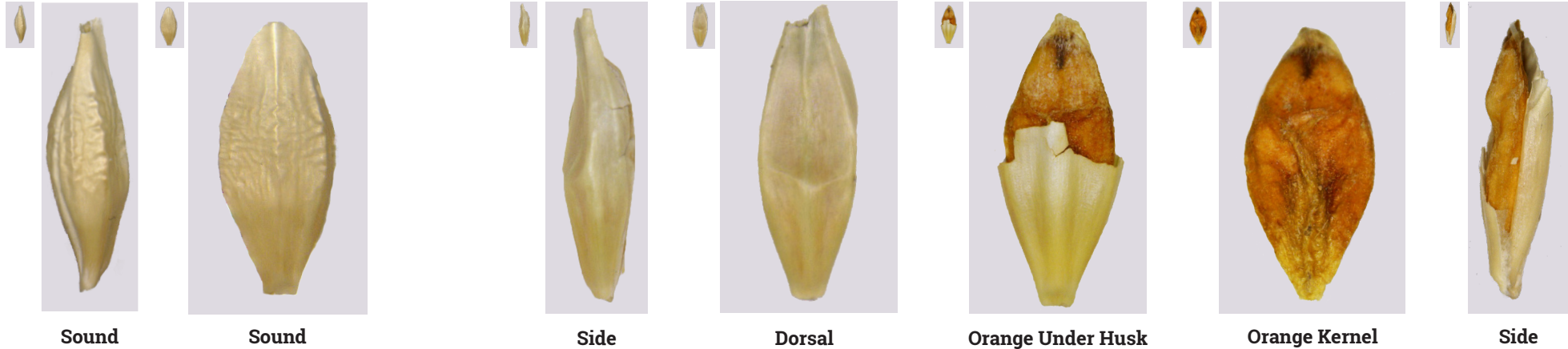
Hormonal Damage

BARLEY: COMMON DEFECTS

Issued: 1st August 2023

Distorted

Definition: Grain which is collapsed on the dorsal side. Grains may also appear orange in colour.



Dry Green or Sappy

Definition Dry Green: Grain surface is distinctly green. Grains are usually dry and hard.

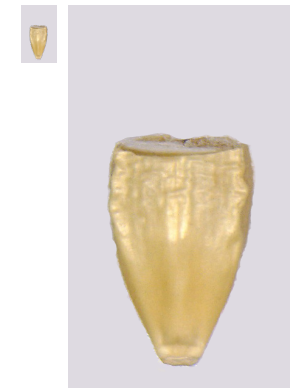
Definition Sappy: Grains are generally soft when pressed. They may or may not be green. Any level of sappiness is classified as defective.



Dry Green

Broken

Definition: Grain that has 1/3 or more missing from the Kernel.



Broken

BARLEY: COMMON DEFECTS

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Heavily Discoloured-WA

Definition: Staining is dark in appearance. Usually affects more than the germ end.



Pink Fungal Staining

Definition: Orange, pink to red discoloration found anywhere on the surface. Grains appear healthy otherwise.



Field Fungi (Spotted/Field Fungi Affected-WA)

Definition: Refers to individual kernels -

- 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, otherwise classified as sound.
- Grey or brown surface discoloration on the kernel and/or husk.



Black Spotting

Black Spotting

Grey Discolouration

**Discolouration on
Kernel**

BARLEY: COMMON DEFECTS

Issued: 1st August 2023

Severely Damaged inc. Fusarium (except WA)

Definition: Damage to the grain causing it to become severely discoloured. A grain exhibits one or more of the following characteristics -

Burnt / Heat Damaged:

Heat Damaged or Burnt refers to those kernels that have become discoloured. Affected grains appear dark brown, or in severe cases, blackened. May also appear discoloured under the husk on the kernel.

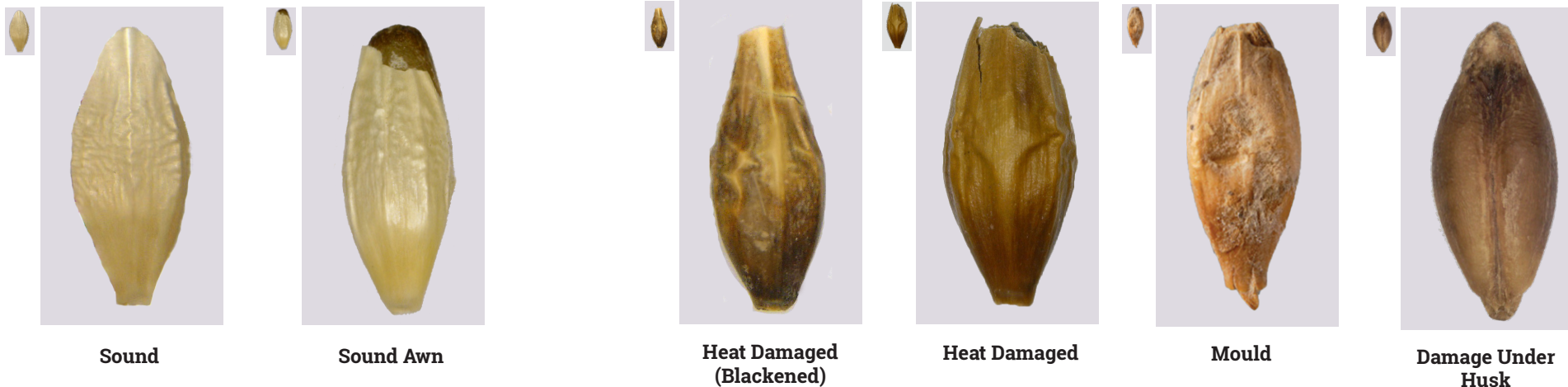
Mould:

Affected grains appear discoloured and visibly affected by mould.

Diseased / Other Serious Visual Defects:

Refers to those kernels that have become significantly discoloured and/or have a serious visual defect that is not otherwise listed in these Standards. It includes grains affected by Fusarium (except WA).

Does not include Field Fungi affected grains, refer to Field Fungi.



BARLEY: CONTAMINANTS/DEFECTS

Coloured Aleurone Layer (Blue or Black)

Definition: Grains which have a coloured aleurone layer in the kernel. The colour is generally blue or black.

It includes any blue or black colour to any degree that is obvious under the bran layer.

Also includes black hulled varieties.



Blue Aleurone Layer



Black Hulled

Insect Damaged

Definition: Any visible insect damage penetrating through to the white endosperm.



Pickling Compounds or Artificial Colour (Pickled Barley-WA)

Definition: An unnatural surface colour and/or colour that rubs off. Any grains that are artificially coloured, regardless of intensity, are defective.

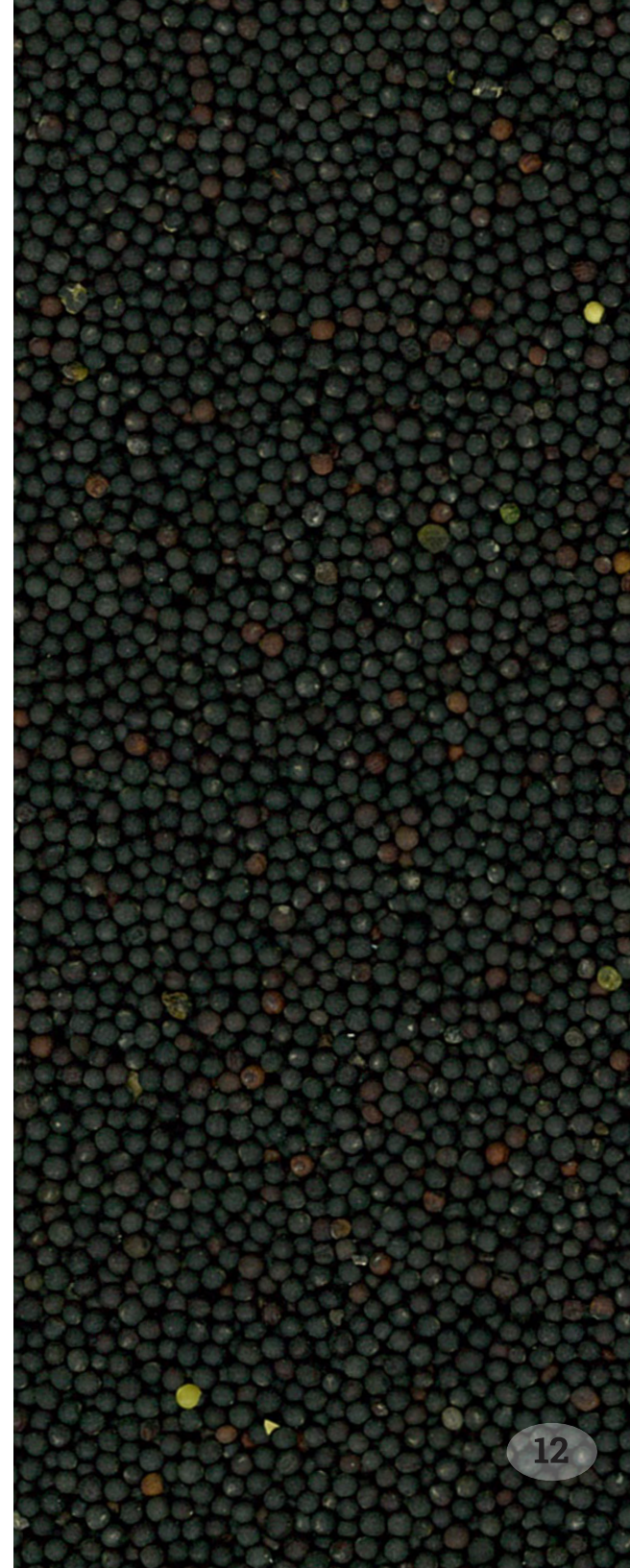
Note: These photographs are to illustrate artificial colours and appearance only. A **nil tolerance** applies to any pickling compounds/contaminants, regardless of intensity or coverage or colour.



CANOLA



Sound

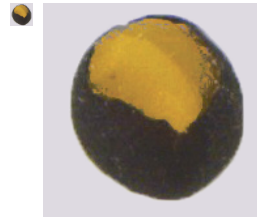


CANOLA: COMMON DEFECTS

Issued: 1st August 2023

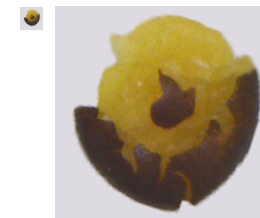
Broken or Split

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



Heat Damaged

Definition: 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



Defective Crushed

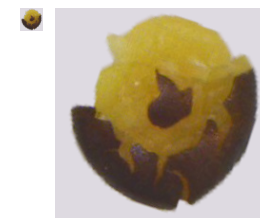
Sprouted

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.

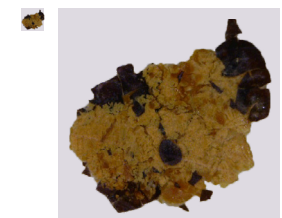


Weather Damaged

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



Sound Crushed



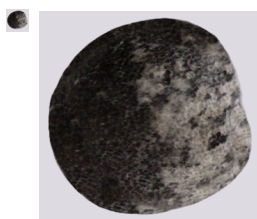
Defective Crushed

CANOLA: COMMON DEFECTS

Issued: 1st August 2023

Mould

Definition: 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.



Frost Damaged

Definition: Frost damaged seeds are included in Impurities. Frost damaged seeds are included in admixture (WA).



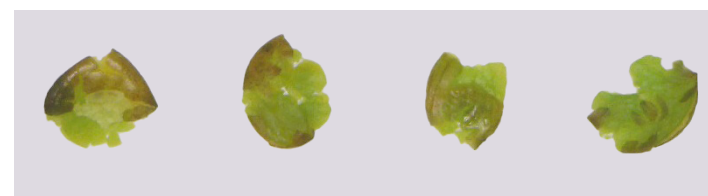
Green Seeds

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



Sound Crushed

Yellow or Yellow-Green when crushed



Defective Crushed

Green Seed – distinctly green when crushed

CHICKPEAS, DESI



Sound



CHICKPEAS, DESI: COMMON DEFECTS

Issued: 1st August 2023

Severely Damaged

Definition: Damage to the grain causing it to become severely discoloured. A grain exhibits one or more of the following characteristics -

Burnt / Heat Damaged:

Heat Damaged or Burnt refers to those grains that have become severely discoloured. Affected grains appear dark brown, or in severe cases, blackened.

Mould:

Affected grains appear discoloured and visibly affected by mould.

Diseased / Other Serious Visual Defects:

Refers to those grains that have become significantly discoloured and/or have a serious visual defect that is not otherwise listed in these Standards.



**Sound -
Refer Stained and
Weather Damaged.**



Heat Damaged



Mould



Mould

CHICKPEAS, DESI: COMMON DEFECTS

Issued: 1st August 2023

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 -

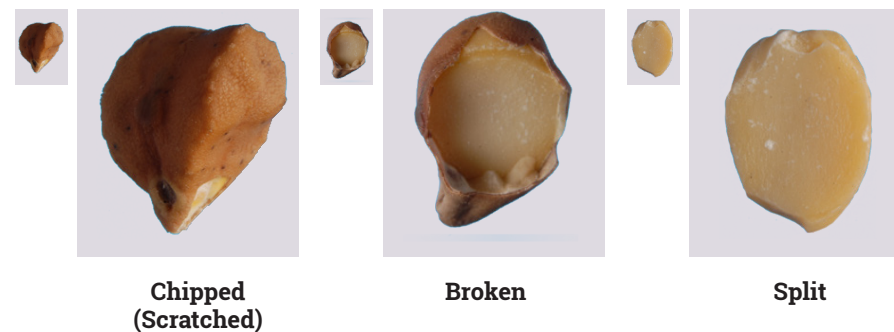
Seed Coat:

- 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.



CHICKPEAS, DESI: COMMON DEFECTS

Issued: 1st August 2023

Insect Damaged

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



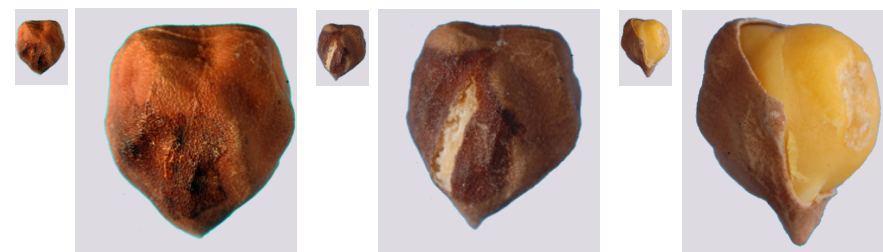
Sprouted

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.



Hail Damaged

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



CHICKPEAS, DESI: COMMON DEFECTS

Issued: 1st August 2023

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 show a level of discolouration depending on the extent of damage. Grains are often smaller than the majority in the sample.



Green

Definition: Green is included in Poor Colour.

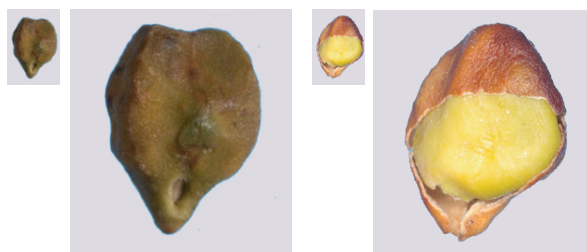
Seed Coat:

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.

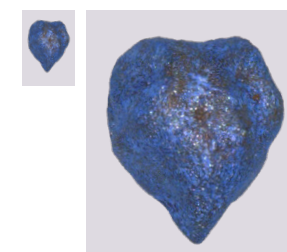


Green Kernel

Pickling Compounds or Artificial Colour

Definition: 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/contaminants, regardless of intensity or coverage or colour.



CHICKPEAS, DESI: COMMON DEFECTS

Issued: 1st August 2023

Poor Colour

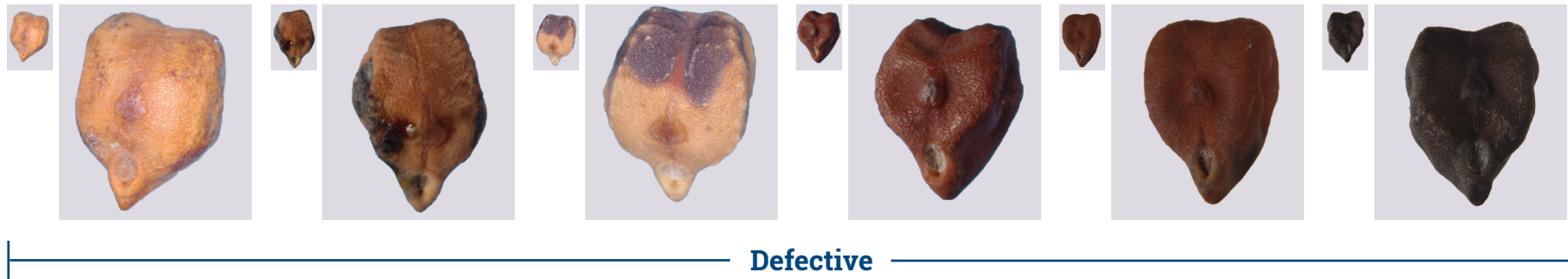
Definition: Green is included in Poor Colour. Stained and Weather Damaged is included in Poor Colour. Fungal Affected is included in Poor Colour.

Seed Coat:

Seed coats vary from dark brown to black, but may be depicted by other colours. Seed coats may be similar in appearance to various other defects such as Severely Damaged.

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

Poor Colour kernel can only be assessed if the seed coat is removed.

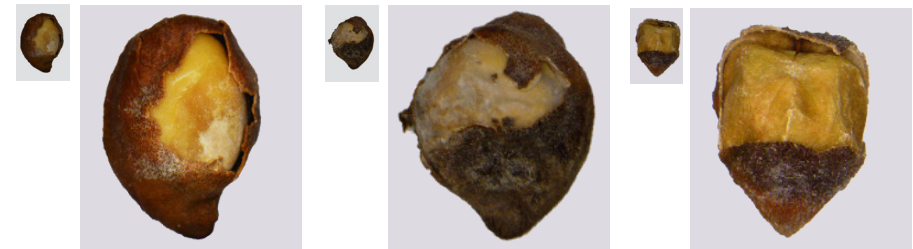


Kernel:

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



**Not Poor Colour Kernel.
Refer Poor Colour Seed Coat.**



Defective Kernel, therefore this is classified as Poor Colour.



CHICKPEAS, DESI: COMMON DEFECTS

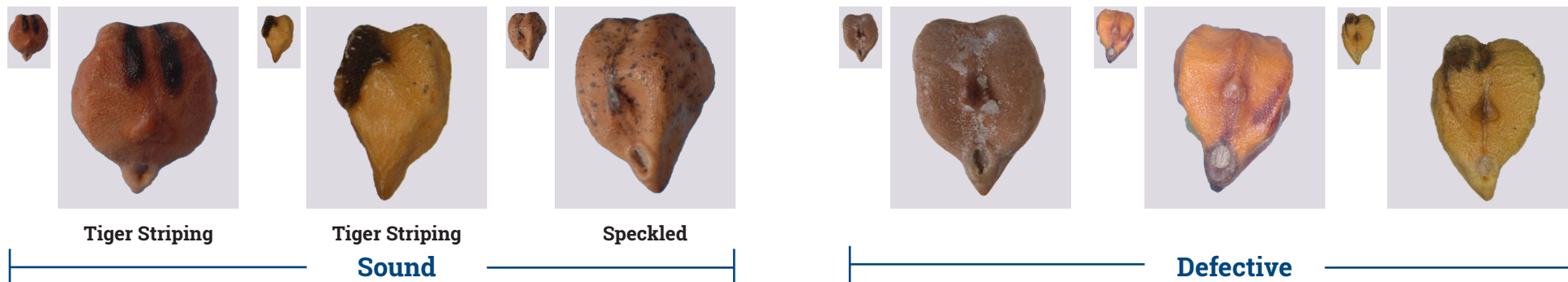
Issued: 1st August 2023

Stained and Weather Damaged

Definition: Stained and Weather Damaged is included in Poor Colour.

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 a Loose Seed Coat or Shrivelled and Wrinkled.

Any degree of Tiger Striping or Speckled is not considered Poor Colour, but is considered sound. Tiger Striping or Speckling on the kernel is to be classified as Poor Colour Kernel.



Fungal Affected (e.g. Ascochyta)

Definition: Fungal Affected is included in Poor Colour.

Lesions are generally visible to the naked eye and appear intense dark brown to black. The lesion may be similar in colour to Severely Damaged or Stained and Weather Damaged.

Any lesion of any size is permitted provided it is not also present on the kernel. If the lesion is greater than approximately 20%, but does not penetrate to the kernel the grain is classified as Stained and Weather Damaged.



CHICKPEAS, KABULI



Sound



CHICKPEAS, KABULI: COMMON DEFECTS

Issued: 1st August 2023

Poor Colour

Definition: Seed coats vary from dark brown to black, but may be depicted by other colours. Seed coats may be similar in appearance to various other defects such as Severely Damaged.

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



Insect Damaged

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



CHICKPEAS, KABULI: COMMON DEFECTS

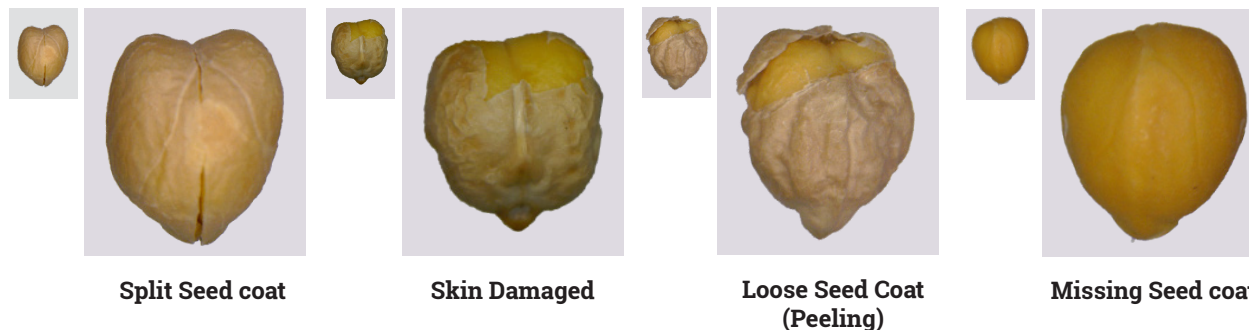
Issued: 1st August 2023

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 -

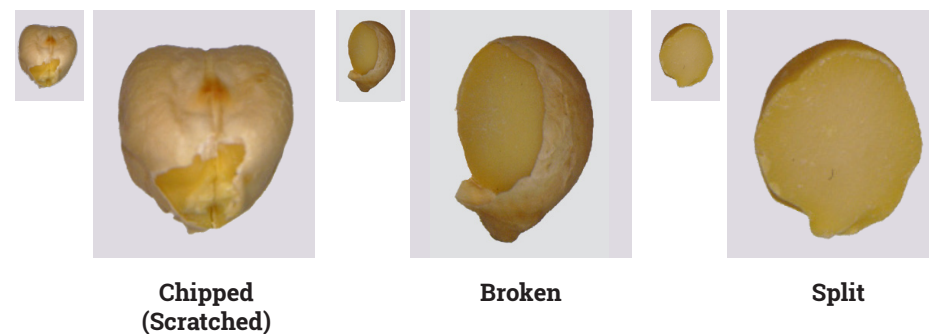
Seed Coat:

- 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



CHICKPEAS, KABULI: COMMON DEFECTS

Issued: 1st August 2023

Severely Damaged

Definition: Damage to the grain causing it to become severely discoloured. A grain exhibits one or more of the following characteristics:

Burnt / Heat Damaged:

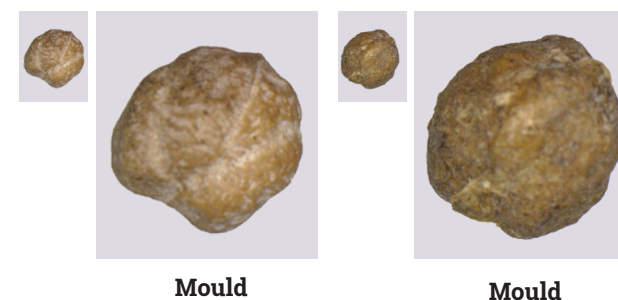
Heat Damaged or Burnt refers to those grains that have become severely discoloured. Affected grains appear dark brown, or in severe cases, blackened.

Mould:

Affected grains appear discoloured and visibly affected by mould.

Diseased / Other Serious Visual Defects:

Refers to those grains that have become significantly discoloured and/or have a serious visual defect that is not otherwise listed in these Standards.



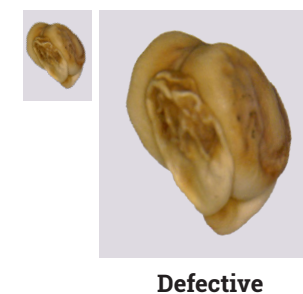
Sprouted

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.



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 show a level of discolouration depending on the extent of damage. Grains are often smaller than the majority in the sample.



FABA BEANS

***Where applicable, Broad Beans should be assessed using Faba Bean visual images.*



Sound



FABA BEANS: COMMON DEFECTS

Issued: 1st August 2023

Severely Damaged

Definition: Damage to the grain causing it to become severely discoloured. A grain exhibits one or more of the following characteristics -

Burnt / Heat Damaged:

Heat Damaged or Burnt refers to those grains that have become severely discoloured. Affected grains appear dark brown, or in severe cases, blackened.

Mould:

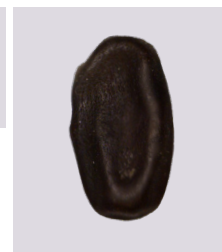
Affected grains appear discoloured and visibly affected by mould.

Diseased / Other Serious Visual Defects:

Refers to those grains that have become significantly discoloured and/or have a serious visual defect that is not otherwise listed in these Standards.



**Pod Fluff
Sound**



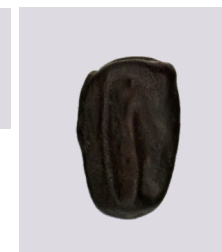
Burnt



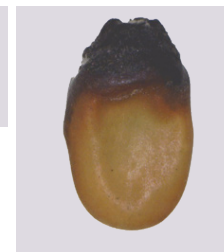
Heat Damaged



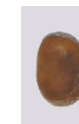
Heat Damaged



**Other Serious
Visual Defect**



Mould



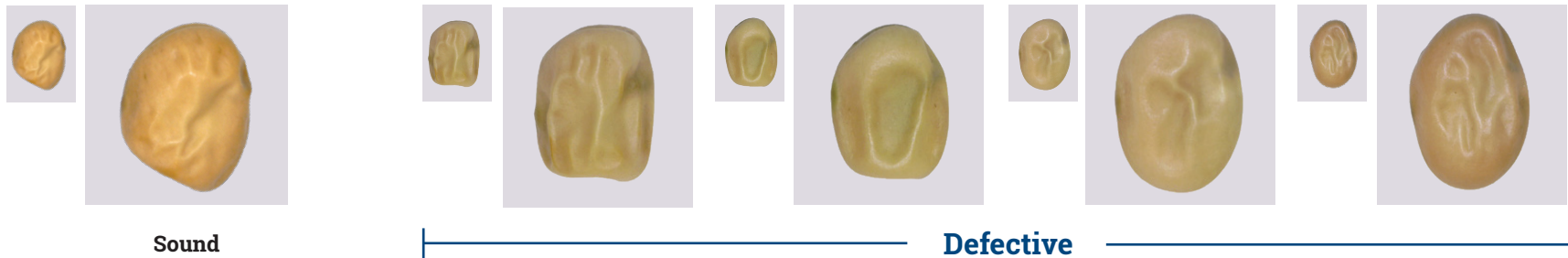
Mould

FABA BEANS: COMMON DEFECTS

Issued: 1st August 2023

Shrivelled and Wrinkled

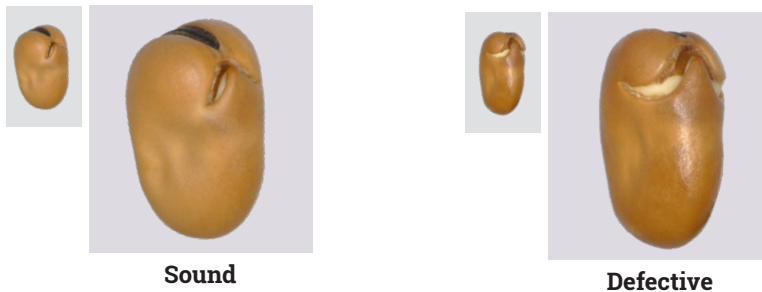
Definition: Visible damage to the seed coat or size and shape of grain whereby the grains are severely distorted and/or shrunken. Seed coats may show a level of discolouration depending on the extent of damage. Grains are often smaller than the majority in the sample.



Sprouted

Definition: 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.

Where the seed coat has split but the primary root has not emerged, the grain is to be classified under Broken, Chipped, Loose Seed Coat and Split.



Insect Damaged

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



FABA BEANS: COMMON DEFECTS

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 -

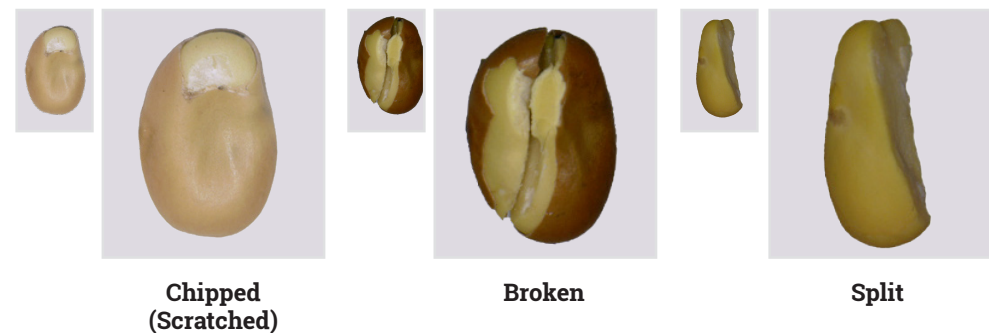
Seed Coat:

- 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. Split may or may not be tightly adhering to the kernel.
- 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.



FABA BEANS: COMMON DEFECTS

Poor Colour

Definition: Green is included in Poor Colour. Fungal Affected is included in Poor Colour. Frost Damaged, Stained is included in Poor Colour. Pea Seed Borne Mosaic Virus is included in Poor Colour.

Seed coats vary from grey, dark brown to black but may be depicted by other colours. Seed coats may be similar in appearance to various other defects such as Severely Damaged.

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



Green

Definition: Green is included in Poor Colour.

Seed Coat:

Seed coat appears intense green. It is recommended the kernel be inspected if immature grains are present.

Kernel:

Any level of green is classified as defective.



FABA BEANS: COMMON DEFECTS

Issued: 1st August 2023

Fungal Affected (e.g. Ascochyta)

Definition: Fungal Affected is included in Poor Colour.

Lesions are generally visible to the naked eye and appear intense dark brown to black. The lesion may be similar in colour to Severely Damaged or Stained and Weather Damaged. 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.

Any lesion of any size on the kernel is defective.



Stained and Weather Damaged

Definition: Stained and Weather Damaged is included in Poor Colour.

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 these Standards. Weather Damage may also lead to a Loose Seed Coat or Shrivelled and Wrinkled.

Seed Coat:

Visible damage to the seed coat resulting in staining on the seed coat only. Seed coats may be discoloured or altered in size or shape.

Kernel:

Any damage to the kernel is classified as defective.



Defective
(Seed Coat Affected)

Defective (Kernel Affected)
Photos do not depict minimum required

FABA BEANS: COMMON DEFECTS

Pea Seed Borne Mosaic Virus

Definition: Pea Seed Borne Mosaic Virus is included in Poor Colour. Staining on the seed coat caused by the Pea Seed Borne Mosaic Virus.

