**Inspecting grain for defects and impurities**

### Diseases

**Fusarium**
- Pale moulds indicate possible Fusarium infection.
- Some Fusarium fungi can produce mycotoxins that are toxic to humans and animals. Permitted mycotoxin levels are governed by legislation or trading specifications.

**Mouldy grains**
- Dusty, weathered grains indicate poor harvest conditions and may impair quality, eg unthreshed gluten.
- Dust may be due to spores or moulds which are unacceptable to all users due to the risk of mycotoxin formation.
- Spores present health hazards and must not be inhaled.

**Ergot**
- The fusing body of the fungus *Claviceps purpurea* affects grasses as well as rye, wheat and barley.
- The inside of an ergot is grey/brown, which distinguishes it from rodent droppings.
- Ergot is toxic to humans and animals and is unacceptable to any processor.

**Lost embryos**
- Embryos may be damaged mechanically or by mice (but not insects).
- Damage to mice or insects may indicate poor storage.

**Sprouted grains**
- Germinated grains, caused by wet harvest conditions, will have very high levels of alpha-amylase. Even a few in a bulk can reduce Hagberg Falling Number to unacceptable values, resulting in rejection of milling wheat.

**Burnt grains/heat damage**
- Heat damage arises from localised 'hot spots' or excessive temperatures during drying.
- Grains can range in colour from bronze to dark brown (charred).
- Such wheat is unacceptable. Over-dried grain will have irreversibly damaged gluten.

**Black point**
- As a response to infection, the plant produces chemicals in the bran which vary from brown to black over the germ area.
- Black point is often associated with Alternaria infection but this is not the only cause. Some varieties are more prone to black point than others.
- Dark bran specks in flour can affect flour quality.

### Weed problems

**Brome**
- 25mm
- Actual size

**Black-grass**
- 8mm
- Actual size

**Couch**
- 7–14mm
- Actual size

**Wild oats**
- 20–30mm
- Actual size

**Bindweed**
- 3–4.5mm
- Actual size

**Cleavers**
- 2–3mm
- Actual size

**Brassica**
- 2–3.5mm
- Actual size

**For best practice grain sampling and storage for cereals and oilseeds, consult the Grain sampling guide and the Grain storage guide, or go to:**

- cereals.ahdb.org.uk
- cereals.ahdb.org.uk/grainstorage
Inspecting grain for defects and impurities

Smell

When inspecting grain, note any unusual smells. A sweet or musty smell indicates mites; musty and fishy smells indicate moulds; chemical smells, eg cleaning fluids and diesel, can also occur.

- If the grain is visibly mouldy or dusty, do not smell it. Moulds and grain dust can be harmful if inhaled and cause respiratory problems.

Physical damage

Broken grains

Characteristics of broken grain are due to aggressive handling, providing potential sites for mould infections. Grain can cause processing problems. These include excessive water uptake and mushy steep with starch leaching into steep water.

Bumt grains/heat damage

Heat damage arises from localised ‘hot spots’ or excessive temperatures during drying. Grains can range in colour from brown to dark brown or black. Overmilled grains are unlikely to germinate and may affect beer or malt flavour.

Splitting

Occurrence of outer grain tissue may arise from excessive expansion or mechanical weakness. Splitting occurs along the ventral (dorsal) area. Pre-germinated grains may not malt and hence malt yield will be reduced. Dust problems during handling may arise. More prevalent in spring varieties.

Gape

A gap between husk tissues (lemma and palea) may result from adverse growing, harvest or storage conditions. Quality may be impaired. Dust may be due to spores or moulds, which are unacceptable in all cases due to the risk of mycotoxin formation.

- Spores present possible health hazards and must not be intimated.

Pre-germination (light)

Recognised by a brown and steeped grain area. Pre-germinated grains may not malt and hence yield will be reduced.

Pre-germination (heavy)

Sprouted grains with visible rootlets will not malt and hence yield will be reduced.

Discoloured grain

The fruiting body of the fungus Claviceps purpurea, which affects grasses as well as rye, wheat and barley.

Fusarium

Pink moulds indicate possible Fusarium infection.

Some Fusarium fungi can produce mycotoxins that are toxic to humans and animals. Permitted mycotoxin levels are governed by legislation or trading specifications.

- May cause gushing of bottled beers.

Mouldy grains

May result from adverse growing, harvest or storage conditions. Quality may be impaired. Dust may be due to spores or moulds, which are unacceptable in all cases due to the risk of mycotoxin formation.

- Spores present possible health hazards and must not be intimated.

Ergot

The fruiting body of the fungus Claviceps purpurea, which affects grasses as well as rye, wheat and barley.

- The inside of an ergot is grey/white, which distinguishes it from rotted droppings.

- Ergot is toxic to humans and animals and as such is unacceptable to any processor.

Dull looking, weathered grain indicates poor health and may lead to quality problems.

Lost embryos

- Of no use for malting as the grain will not germinate.

Screenings

Untreated non-cereal matter (eg chaff, straw, stones). Stones can damage machinery; metal objects may cause sparks.

Large screenings

Stones, broken, unhulled grain, sticks, stones, etc.

Small screenings

Broken grains, shrivelled grain, chaff, weed seeds and small straw pieces.

Mud and stones

Mud balls are a particular problem during rain. Stones can be picked up during combining, particularly when harvesting conditions are difficult.

Dust, chaff and fine soil

Grain dust can be harmful if inhaled and cause respiratory problems.

Weed seeds

Brome

- 25mm

Black-grass

- 6mm

Couch

- 1.44mm

Wild oats

- 2–30mm

Bindweed

- 3–4.5mm

Cleavers

- 2–0.08mm

Brassica

- 2–3.5mm

Pests

Rodent droppings

- Rodents directly damage grain and carry infection.

- Rodents urinate on grain, posing a food safety risk.

- Severe infestations (as in this example) are unacceptable to processors.

Weed seeds

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Actual size

Black-grass

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