

AWB Wheat Quality Fact Sheet

Ergot

AWB Receival Standards

The AWB Limited Wheat Receival Standards defines Ergot as purplish black fungal bodies which contaminate cereal and ryegrass kernels when they are infected by the fungus *Claviceps purpurea*.

As Ergot pieces contain alkaloids that are extremely toxic to both humans and animals, AWB Limited has set tight Receival Standards.

Ergot is assessed in a half litre sample, with a maximum length of 2 cm for Ryegrass Ergot and 1 piece of Wheat Ergot applying. Any pieces of Ryegrass Ergot detected are aligned end on end, and their combined length measured. These tolerances apply to all grades of wheat.

Nature

Ergot occurs throughout the world and affects many grass species including cultivated cereals. Ergot is relatively rare in Australian grains, however it is considered a constant threat as it contains toxic chemicals (alkaloids) that are very harmful to both animals and humans. For this reason Ergot in grain could prove quite damaging to our trade.

Crops affected by Ergot generally do not experience significant yield losses, but economic losses can be quite severe when grain tendered by growers is rejected at receival.

Cause

The fungal pathogen *Claviceps purpurea* is responsible for the development of Ergot. Pieces are hard and take the form of dry fungus bodies called sclerotia. Characteristically Ergot pieces have a purple – black surface with a white to grey interior. They are usually horn like in shape and replace one or more grains in the heads of cereals and grasses. These Ergot bodies can be up to four times larger than normal grain.

The disease cycle of Ergot consists of two stages. The cycle begins in spring when the Ergot bodies germinate in wet soils after a period of cold temperatures (winter) and develop fruiting bodies that contain spores

(ascospores). These spores can be spread to neighbouring susceptible plants by wind and rain. To infect these plants, the spores must land on the florets and within five days the second stage commences, referred to as the “honeydew stage”. During this stage the infected florets exude a sugary slime that contains spores (conidia). These spores can in turn infect other florets via insect vectors, rain splash and/or wind. This period of infection lasts for as long as the susceptible plants are in flower. The infected ovary in the floret then enlarges and is replaced by the purple – black Ergot body that can survive in soil for up to one year.

Impact

Ergot bodies contain alkaloid chemicals that can cause lameness, gangrene of the extremities and nervous convulsions (staggers) that can lead to death in both humans and animals. As these toxins accumulate in the body, symptoms can begin to occur after long periods of low level ingestion.

The development of Ergot is favoured by moist soil surfaces during spring and early summer. In addition, wet conditions during flowering of cereals and grasses increases the period of infection.

Cereal rye and many grass species (including ryegrass) are particularly susceptible to Ergot because they are open flowered species. Triticale and hybrid wheat varieties are considered to be more prone than other wheats because they have more open flowers. Self-pollinated species such as oats and barley are less likely to be infected.

Crops are generally perceived to be at greatest risk when grass weed populations are high. Infected grasses usually produce slender Ergots and in some cases can be fully responsible for the contamination of grain samples.

During milling, Ergot pieces generally disintegrate into fine dark pieces that become evident as dark specks in end products. Furthermore, the toxic chemicals associated with pieces of Ergot remain active even after processing.

What can be done?

For grain that is contaminated with pieces of Ergot, grain-cleaning equipment can be used to remove the majority of Ergot bodies. However the grower will need to determine whether this is an economically viable option.

To avoid the development of Ergot in subsequent cereal crops, effective farm management practices are required. One option available to growers is the use of crop rotations away from cereals for at least one year to reduce the amount of viable Ergot pieces in the soil to negligible levels.

During planting clean seed must be used, as there is currently no effective treatments against Ergot. For growers using conventional tillage, Ergot pieces need to be buried to a minimum depth of 4 cm. This prevents the fruiting bodies that are produced by the Ergot from reaching the soil surface and releasing spores. This may have an effect on the usual sowing operations and guidance should be sought.

Finally, to eliminate the development of host reservoirs growers may be able to mow or spray grass pastures to prevent flowering.