

## Other toxins

<a href="#">☐</a>	<b>Ergot</b>
<a href="#">☐</a>	<b>Annual ryegrass toxicity</b>
<a href="#">☐</a>	<b>Phomopsis</b>
<a href="#">☐</a>	<b>Karnal bunt</b>

### Ergot

Ryegrass ergot [☐](#), which is the sclerotes of the fungus *Claviceps purpurea*, forms a dark purple mass which replaces one or more of the grains on an ear of rye. Ergot has been a problem in North America and has also been a problem in Europe since the Middle Ages. The fungus produces extremely toxic alkaloids (ergotamine group, derivatives of lysergic acid, as in LSD). These alkaloids can cause hallucinations, convulsions, gangrene and death (see *Mycotoxins in Grain*, Miller & Trenholm 1994).

Identikit also shows ergot of [wheat](#) and an [ergot-affected head](#).

#### International ergot standards

USA—wheat and rye 0.3%  
 Canada—rye 0.05% to 0.33% (subject to grade)  
 European Union—0.05%

#### AWB Ltd receival standards

Ryegrass Ergot—2cm. The tolerance applies to the maximum length that the pieces are not to exceed when aligned end on end.

Wheat Ergot—1 piece per half litre.

Ergot alkaloids are determined by HPLC (Scott *et al.* 1992; Ware *et al.* 1986).

Sorghum ergot, which has recently become a problem in Queensland, occurs at flowering in cool humid weather, and may be similar to the pearl millet ergot found in India. This ergot is produced by a different *Claviceps* species, is not related to the lysergic acid group, and does not have the same toxicity. It may cause gastroenteritis, and there is some evidence that it may cause lactation to cease. The Queensland Agricultural Standards Legislation 1997 allows 3g/kg of sorghum ergot (*Claviceps africana*), and GRAINCO revised the receival standards to this level. 3g/kg is equivalent to 30 sclerotes per 0.5 litre. Feeding trials have indicated that there is insignificant toxicity at a level of 1% (10g/kg). Refer QDPI telephone inquiry number 07 3239 3111.

Click to return to the [Other toxins sub-menu](#).

### Annual ryegrass toxicity

Annual ryegrass toxicity (ARGT) is a potentially fatal disease in sheep grazing on infected annual ryegrass (*Lolium rigidum*). It is caused by the group of toxins known as corynetoxins which inhibit enzymes involved in protein metabolism. The corynetoxins are closely related to the antibiotic tunicamycin. The toxins are produced by the bacterium *Clavibacter toxicus* which is carried into the plant on a nematode *Anguina funesta*.

ARGT is confined to Australia and a small area of South Africa. In Australia it is currently confined to parts of South Australia and Western Australia, although there is a related disease called flood plain staggers in northern New South Wales.

ARGT became an important issue and a potential threat to markets in 1997, when, in 3 separate incidents, the death of Japanese dairy cattle was caused by ARGT on oat hay exported from Western Australia.

The presence of the bacterium can be detected by looking for bacteria or nematode galls. The first sign is the appearance of sticky yellow slime on ryegrass seedheads.

Agriculture WA has developed an ELISA test for the presence of the bacterium. A sensitive ELISA test for the toxin has recently been developed and is being used to check for corynetoxin in export grain and hay. It requires a 3 kg sample. A level of 5  $\mu\text{g}/\text{kg}$ , equivalent to about 1 gall per kg of grain, has been adopted by the fodder industry. The tolerable daily intake is about 10-70  $\text{ng}/\text{kg-bw}$ , similar to ochratoxin.

Click to return to the [Other toxins sub-menu](#).

## Phomopsin

*Phomopsis leptostromiformis* is a fungal pathogen, largely confined to lupins. It produces several mycotoxins of which the principal one is phomopsin A. This mycotoxin causes the disease lupinosis in sheep which have been grazing on lupin stubbles. Symptoms include liver damage with jaundice and general non-productivity. Other animals, for example pigs, are less susceptible than sheep, but phomopsin A is known to produce liver cancer in rats. In years of high rainfall, 3-10 % of discolored infected seed has been found in the crop. The level of phomopsin in discolored seed may reach 3.4  $\text{mg}/\text{kg}$  (ppm). According to Hough (1993) the highest level found in bulked seed in Western Australia was 360 ppb. The no-effect level in sheep is about 24  $\mu\text{g}/\text{kg-bw}$  daily.

The use of lupin seed flour as a protein additive has been proposed, but final products must satisfy the Australian limit of 5 ppb for human consumption.

## Karnal bunt

Flag smut, common bunt and [loose smut](#) are present in Australia, and are controlled by using fungicides as seed dressings. Dwarf bunt (*Tilletia controversa*) and karnal bunt (*Tilletia indica*) are not present in Australia and are objects of quarantine; the presence of these bunts would have a serious effect on yields and the marketability of Australian grain.

Click to return to the [Other toxins sub-menu](#).

Now click *Weedseeds* or another selection from the sidebar.