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Annual ryegrass toxicity and blown grass/beard grass poisoning

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This Primefact covers annual ryegrass toxicity (ARGT) and the related livestock poisonings associated with blown grass *(Agrostis avenacea)* and annual beard grass *(Polypogon monspiliensis),* in NSW Australia.

For at least 40 years an unusual form of poisoning has occurred in livestock grazing annual ryegrass and annual beard grass pastures in South Australia and Western Australia. In 1990 this same form of poisoning occurred in NSW in livestock grazing another annual grass called blown grass. Frequently referred to as 'ARGT' or 'ARGT-like', this toxicity kills large numbers of livestock throughout southern Australia every year. It can rise to outbreak proportions in some districts in years with particularly favourable weather conditions.

How do some annual grasses become toxic?

The bacterium *Rathayibacter toxicus* can be carried by an *Aguina* spp. nematode into the developing seed heads of some annual grasses, where it eventually produces a powerful tunicamycin–like poison called corynetoxin. Poison production occurs when the grass is haying off, or 'senescing'. Any cattle, sheep, goats, horses or pigs that eat infected seed heads can die.

These seed heads may contaminate hay made from affected pastures and this hay can also kill the animals that eat it. An ARGT-like poisoning can sometimes occur in livestock fed water-damaged, mouldy wheat, but in these cases a different bacterium and a different tunicamycin-like poison are involved.

Grasses affected by the bacterium

Rathayibacter toxicus most commonly infects annual Wimmera ryegrass *(Lolium rigidum),* but grasses such as blown grass and annual beard grass can also be infected. Annual ryegrass toxicity is widespread in the agricultural districts of SA and the wheat belt of WA.

Annual beard grass toxicity is a persistent problem in some areas of south-eastern South Australia and blown grass toxicity occurs intermittently in north-western NSW.

Rathayibacter toxicus infection has so far not been detected in annual ryegrass infested pastures and crops growing in NSW.

Signs in affected livestock

Livestock affected by ARGT, or ARGT-like disorders, display the following clinical signs.

- Initially they are reluctant to move.
- When disturbed they move with an uncoordinated gait.
- Their limbs appear weak.
- Individual muscle movements are rather rigid, irregular and abrupt, and whole limb movements may be excessively pronounced.
- While running they may suddenly fall on their knees, brisket or head.
- When at rest they adopt a wide-based stance, sway their head, drool, and experience frequent muscle twitches.
- Some may display a backwards and forwards rocking motion.
- Many affected animals eventually fall down, convulse and then get up again.
- Between these convulsive episodes some can appear to be normal but most remain apprehensive, depressed and off their food. Mild, forced exercise or excitement can cause a rapid recurrence of clinical signs and many affected animals will die during convulsions.

The death rate from ARGT can be very high.

Delayed onset of clinical signs

Stock may ingest a lethal dose of the poison during their first day on a toxic pasture but about 4–5 days will pass before any signs of ill health develop. Death may occur within hours of the first clinical signs or not until many days later. Deaths may continue to occur for up to a week after animals have been removed from an infected pasture.

Autopsy and laboratory findings

Autopsy examination of affected cattle and sheep will reveal similar findings. These findings are consistent with this form of poisoning but not conclusive for it. The lungs may be congested and oedematous, with froth in the airways. Small focal haemorrhages may be present on the surfaces of the heart, the liver may be pale and swollen and the brain mildly swollen and congested. Microscopic examinations of tissue sections from these organs reveal changes that are consistent with their gross appearance, but non-specific in nature.

The most reliable indicator of the presence of an ARGT-like poisoning in livestock is the clinical signs – for example intermittent episodic convulsions – together with finding *Rathayibacter toxicus* infected grass seed heads in the food eaten.

What to look for in suspect pastures

During the investigation of a suspect outbreak look for twisted and deformed grass seed heads, some of which may have an orange-yellow exudate forming on them. This exudate soon dries off, but inspection under a magnifying glass should still reveal individual seeds that have changed into swollen, discoloured, bacteria-infected, seed galls.

In NSW this suspect plant material should be forwarded to the diagnostic laboratories at the Orange Agricultural Institute for confirmation of the presence of *Rathayibacter toxicus.* Outbreaks only occur when the infected poisonous grass in the pasture has reached a mature stage of growth, seed set is obvious and the grass itself hayed-off.

A careful inspection of many seed heads in the affected grass population will eventually reveal the presence of darkish nematode gall enlargements in some seeds and orange-yellow bacterial gall enlargements in others.

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