



Perennial Ryegrass Toxicosis

Dr David Champness, Hamilton

Updated: February 2008

AG0700

ISSN 1329-8062

Perennial ryegrass toxicosis (PRGT) can be a serious and widespread problem in livestock grazing perennial ryegrass dominant pastures during the summer and autumn months. The condition occurs annually, particularly in southern Victoria, and in some years serious incidents of PRGT result in devastating animal losses.

The most commonly recognized symptom of PRGT is 'ryegrass staggers' which can be seen in sheep, cattle, horses, deer and alpaca. Less obvious signs may include ill-thrift, especially in young stock, heat stress, scouring, reduced fertility and lowered milk production, which all contribute to production losses and animal welfare concerns even when staggers are not seen.

There is no specific treatment for PRGT, however toxic pastures can be avoided with careful animal and pasture management strategies. A risk management approach on farms known to be at risk of PRGT will reduce the incidence and impact of the disorder.

What causes PRGT?

Perennial ryegrass (*Lolium perenne*) is the most commonly sown pasture grass in Australia, occupying over 6 million hectares, with 4 million hectares in Victoria. About 90% of established perennial ryegrass plants are infected with an 'endophyte' fungus known as *Neotyphodium lolii*. This tiny fungus lives in the plant between cells, particularly in the leaf sheath and seed heads. The fungus is not harmful to the grass, and in fact benefits the plant by enhancing seedling vigour, tillering, seed production and resistance to drought and some insect pests. However, the fungus produces chemicals (alkaloids) which can produce toxic effects in livestock grazing infected pastures, particularly between late spring and early winter.

Perennial ryegrass staggers

The most commonly recognised sign of perennial ryegrass toxicity is 'staggers', which may occur within a few days of exposure to infected pastures (or hay or silage).

Mildly affected stock develop tremors which are exaggerated by external stimuli. As the toxicosis worsens, animals lose coordination, develop a stiff gait and lose control of their direction of movement. They may collapse,

have convulsions, and be unable to rise, leaving them susceptible to dehydration, starvation and attack by predators.

Deaths also result from mishaps due to lack of co-ordination, such as drowning in creeks and dams.

If animals are dying it is important to consult your veterinarian to confirm PRGT is the problem.

As symptoms are aggravated by physical stress such as mustering, and external stimuli such as humans, dogs, vehicles and other sources of noise, animal husbandry and health control programs are frequently disrupted as stock cannot be moved or handled. Shearing, crutching, drenching, jetting and removal of rams may all have to be postponed which can lead to subsequent disease and death due to preventable conditions such as intestinal parasitism and fly strike. Affected stock cannot be sold until they are free of symptoms.



Sheep affected with Perennial Ryegrass 'Staggers'

Less obvious signs of PRGT

Usually only a small proportion of the herd or flock show signs of staggers. Less obvious problems also occur, even when toxin concentrations are too low to cause staggering.

- Ill-thrift and reduced liveweight gain is the most common problem, and young stock are most susceptible

- Toxins reduce blood flow to the skin and extremities. This reduces the animal's ability to regulate body temperature, leading to heat stress. Sheep and cattle may seek shade for longer periods, reducing grazing time, and may crowd into dams, troughs and streams in an attempt to cool down, sometimes resulting in mass drownings. Reduced blood flow to the extremities may also aggravate foot problems.
- Toxins may disrupt digestion, leading to scouring, dags and fly problems.
- Lowered fertility has been reported in both male and female animals
- Milk yields and milk fat and protein levels may be reduced.

Incidence

Perennial ryegrass toxicity occurs regionally in winter rainfall areas every year, most commonly in summer and autumn. Over the past 25 years there have been four serious incidents in Victoria, resulting in widespread animal losses and welfare problems on many properties (1986, 1993, 2002 and 2005).

In the autumn of 2002, an estimated 100,000 sheep and 500 cattle died as a result of PRGT in Victoria. A similar number of sheep died over the subsequent winter as a result of heavy burdens of intestinal worms, partly due to animals being unfit to muster for strategic drenching in late summer due to staggers.

The most toxic pastures are those dominated by perennial ryegrass. High risk seasons are likely when late season rainfall causes abundant pasture growth and where the following summer and autumn conditions include hot spells during the dry period. The main legume in mixed pastures is often an annual species and is inconspicuous by the time PRGT problems are seen, having dried off, been trampled and decomposed, leaving the pasture as a pure stand of perennial ryegrass.

Management of affected livestock

There is no specific therapy for PRGT. Recovery occurs over 1 to 4 weeks once animals are removed from toxic pastures.

In mild cases of staggers, stock should be left undisturbed or quietly drifted without a dog to a safer paddock with a water trough, rather than open water to avoid the risk of drowning. In more severe cases removal from toxic pasture is vital, but may take several days. Excitement must be minimised to reduce the number of animals that collapse and then require intensive nursing or destruction.

If removal from toxic pasture is not an option, stock can be confined in temporary containment areas with a safe water supply, shade and supplementary feed. Feeding out hay or concentrates on toxic pasture is often unsuccessful, as the mere act of driving a vehicle into a paddock can cause stock to run, stagger and collapse.

Collapsed animals should be moved to sheltered yards or sheds if possible and provided with shade, food and water.

Animals should be harnessed or positioned so they are sitting upright, rather than on their sides, to avoid regurgitation of stomach contents and aspiration into the lungs. Some producers have successfully employed both fence panels and ditches to position affected stock. Narrow ditches can be dug to suspend sheep in an upright position, while preventing them from jumping out. Being mainly below ground, the sheep are kept cool and appear to relax and gain reassurance by the close proximity of other sheep. Provide animals with food and water and remove them daily for assessment. Most will improve within a day or two and can then be moved to yards or sheds for less intensive nursing.

A variety of drugs, vitamins and minerals have been used in an attempt to alleviate toxicosis, however there is little scientific evidence to support their use. Consult your veterinarian regarding appropriate treatment of affected livestock. If animals are collapsed and the owner is unable to provide sufficient feed, water and shelter, the stock must be humanely destroyed as soon as possible.



Nursing 'Staggers' affected sheep in trenches

Preventative risk management plans

A risk management plan should be prepared on properties with perennial ryegrass dominant pastures in winter rainfall areas, particularly where PRGT has previously caused major problems.

Recommendations include:

- Do not sow seed of perennial ryegrass cultivars that carry the 'wild type' endophyte fungus.
- Complete all essential animal handling procedures before the high risk period for PRGT in the autumn.
- Monitor livestock closely during risk periods for early signs of toxicosis, such as staggers, so they can be moved to safe pastures or containment areas.
- Monitor the liveweights of a group of weaner lambs over the summer and autumn to check for appropriate weight gain.
- Remove young stock from potentially toxic pasture between mid-spring until 2-4 weeks after good opening rains have fallen in autumn.

- If safe pastures are not available, move stock to a temporary containment area with a safe water supply during risk periods until adequate rainfall has reduced pasture toxicity. Young stock must be trained to feed by mid-summer if supplementary feeding is planned. This is best done before lambs are weaned.
- Provide a safe watering system and fence off dams and creeks to prevent drowning.
- Toxins concentrate in the seedhead and crown of the grass. Topping grass heads before seed set and prior to grazing may help lower the risk to livestock.
- Toxic pastures can be conserved as hay or silage or grazed by dry / older stock, however hay and silage may retain a high concentration of toxin.
- Grazing management, topping and fertilisers can increase the legume component of mixed grass / clover pastures to reduce the dominance of toxic species.

Reducing PRGT

Pastures can be oversown with vigorous cultivars of legumes and/or other non-toxic grass species such as Italian or hybrid ryegrasses, in order to dilute the toxin level in the diet. However, such species are short-lived.

Eliminating PRGT

The optimum solution to PRGT may be to renovate pastures after first eliminating old perennial ryegrass plants and seeds which contain the 'wild type' endophyte fungus from the environment. This will require a careful crop / spray program and appropriate professional advice is recommended in determining the costs and benefits.

A replacement pasture, which need not include perennial ryegrass, can then be established. Endophyte-free perennial ryegrass cultivars are available, but may not persist as well as endophyte-infected plants, particularly when stressed. 'Beneficial/safe' endophyte cultivars have been developed and produced in New Zealand and are marketed in Australia. The cultivars carry selected strains of fungus which produce little or no livestock damaging toxin, but do provide protective properties to the plant when exposed to drought or pest attack. It is important to seek evidence of these claims when selecting cultivars. Additionally many of the 'safe' cultivars have been developed for high rainfall areas rather than the marginal areas where perennial ryegrass is often grazed in Australia.

Consideration should also be given to the use of alternative permanent pasture species such as lucerne, phalaris (although it occasionally cause a different type of staggers), tall fescue, cocksfoot, chichory and plantain which will not cause PRGT.

Remember that successful pasture renovation will depend on preventing recontamination of new pastures with old perennial ryegrass seed.

Acknowledgements

This agriculture note is based on information from the MLA tips & tools publication *Perennial Ryegrass Toxicosis*.

This agriculture note replaces AG0700 *Perennial ryegrass staggers / illthrift*, by Kevin Reed, published November 1999

The advice provided in this publication is intended as a source of information only. Always read the label before using any of the products mentioned. The State of Victoria and its employees do not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on any information in this publication.