Control strategies for annual ryegrass toxicity

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for
Annual ryegrass toxicity

By W. J. Burdass, Officer in Charge, Katanning District Office

In 1982-83, annual ryegrass toxicity (ARGT) was estimated to have cost Western Australian sheep farmers between $7 and $8 million in total economic losses. This disease can severely disrupt farming operations. Sheep must be checked daily and if affected moved to a ‘safe’ paddock. The availability of paddock feed is reduced, as is stock carrying capacity. Worry about the possibility of dramatic stock losses, and uncertainty about what decisions to make, are all stressful.

Stock losses from ARGT can be minimised by the use of selective herbicides to control ryegrass in pastures and crops. This breaks the disease cycle—the nematode’s life cycle—by substantially reducing gall formation and the amount of ryegrass present. Nematode reproduction must be controlled for at least two seasons to achieve the break.

Checking stock and symptoms
Symptoms of ARGT may appear as soon as 48 hours or as late as several weeks after stock are introduced to toxic paddocks. Once there are reports of stock losses within a district, stock grazing paddocks containing annual ryegrass should be inspected at least once daily to minimise losses. Losses peak during spring and early summer.

The mob should be stirred up and driven briskly for 100 to 200 metres. Animals affected by ARGT will fall behind the mob, show an unco-ordinated gait, stop and usually fall over. They will convulse, typically throwing the head back, and be stiff-legged.

After a few seconds or even several minutes, affected animals will shakily regain their feet and move to catch up with the mob. Symptoms of ARGT may disappear in some animals and they rejoin the mob as though nothing had happened.

The number of deaths depends on the amount of toxic material eaten. Sometimes there are no deaths, while occasionally a whole mob will die.

Moving the mob
When affected animals are found the mob should be moved quietly to a ‘safe’ paddock with good water, safe feed and shade. Two or three rolls of hay placed near the water can be beneficial. The mob should be kept quiet, but checked regularly for further deaths. Animals can continue to go down for several days after being moved to a ‘safe’ paddock. If increasing numbers of animals continue to succumb after four days, the ‘safe’ paddock is suspect, and stock should be moved yet again.

Deaths can continue for a week or more after a mob has been moved from a toxic paddock, but they usually peak after the third or fourth day. Some of the biggest losses have occurred when a mob suffering from the disease is moved into a supposedly ‘safe’ paddock which turns out to be toxic.

Affected and unaffected mobs should not be mixed, if possible, as the supposedly ‘safe’ paddock may become toxic. Unless the two mobs can be easily distinguished, an outbreak in the unaffected mob could occur without becoming immediately apparent.

A mob should not have access to more than one paddock at a time. If a mob has the run of two or more paddocks and an outbreak occurs it is difficult to isolate the paddock or paddocks that are toxic. A watering point in every paddock is essential in districts affected by ARGT.

Survival rates can be improved by giving water with a drenching gun to animals that are down. Some animals down for several
Toxicity signs in the paddock. The first sign is an impression of yellowness in the ryegrass seedheads.

Disease development
The disease development described does not always follow this strict pattern; stock can be in a potentially toxic paddock for days, weeks, or even months and not show any ill-effects, then suddenly show symptoms of the disease. This is because:

- The level of toxin in the ryegrass heads develops gradually and does not reach its peak until the plants mature and dry off.
- Toxic ryegrass may occur only in patches and stock may not graze these parts.
- Ryegrass can be widespread within a paddock, but stock may graze other pasture plants in the sward.
- Ryegrass heads may become more palatable under certain conditions.
- The animals' grazing habits can change, especially if they are starved or yarded overnight for shearing or crutching. Outbreaks frequently appear after a spell of inclement wet weather during which stock may not feed properly and become stressed. When inspecting sheep, farmers should check what parts of the paddock are being grazed and whether ryegrass heads are being eaten.

- Mixing mobs can lead to increased grazing pressure, which makes animals less selective in their grazing.
- In less toxic paddocks ARGT symptoms and deaths may not develop until the paddock is almost eaten out. If a paddock is suspect and 'safe' grazing is available, stock should be moved before they have to scavenge for the 'last bite'.

Treatment of toxic paddocks
Once a paddock becomes toxic, it will remain so. If animals eat enough toxic galls, even after the break of the following season, they will be affected by ARGT. However, as summer progresses and the ryegrass dries off, more galls are shed on to the ground where they are less likely to be eaten. A toxic paddock could therefore provide useful grazing in late summer and autumn, but there is a risk with this practice as stock could die. Grazing pastures that were toxic in spring must be treated cautiously, and stock must be watched closely for the onset of the disease.

Ryegrass pastures in which large numbers of stock have died should not be grazed again that season, unless the ryegrass is confined to a defined part of the paddock which can be fenced off or burnt.

Control and management of ARGT
The best and most practical strategy of controlling and managing ryegrass toxicity is to break the nematode's life cycle by substantially removing the ryegrass host for at least two seasons.

- A light cultivation at the break of the season stimulates the ryegrass seeds to germinate. Seedlings can then be killed by cultivation if conditions are suitable, or with Spray Seed® or Roundup® applied before seeding. Selective herbicides can also be used.

For example, Glean® can be sprayed and incorporated into the soil when sowing wheat and after emergence on wheat, barley and oats. Hoegrass® can be sprayed on wheat and barley after emergence, but it should not be used on oats. When sprayed at the right time, these chemicals will significantly reduce the amount of ryegrass in a paddock.

Trifluralin®, a pre-emergence herbicide which must be incorporated into the soil, can be used on all cereal crops except oats to control ryegrass in the crop. However, it may not reduce the ryegrass population sufficiently to break the nematode's life cycle.

- Pastures can be grazed, spraytopped with Gramoxone W® at 500 mL/ha and then grazed heavily to control regrowth. This is the spraytop-graze technique. Spraying must be carried out early, within 10 days of first
head emergence, to prevent the formation of toxin. If pastures are sprayed later, the chemical will reduce seed set but will not prevent toxin formation. This technique can damage legumes in the pasture at the time of spraying, but usually increases the legume content in the following year.

- Pastures can be grazed heavily to improve clover content. Heavy grazing will not eliminate ryegrass, but it can reduce both the ryegrass content and the amount of seed set.
- Gramoxone W® sprayed in early to mid winter will reduce the amount of ryegrass present in pasture, but it may also check the broad-leaf species. Hoegrass® will remove only ryegrass and Fusilade 212® will remove ryegrass, brome and barley grass, but not silver grass from the sward.
- Ryegrass paddocks can be burnt to reduce the number of galls that carry over to the next season.

Burning-off in early summer while the galls are still in the ryegrass heads is most effective because the seed heads are erect and no seed is shed, but pasture feed is lost. An autumn burn will also reduce seed numbers and bacterial galls and there is less risk of wind erosion.

Pastures containing appreciable amounts of burr medic (Medicago polymorpha) should not be burnt, especially in the first year of establishment, as fire will kill the medic seed. These paddocks should be cropped, using selective herbicides to control ryegrass thoroughly.

Whatever treatment or combination of treatments is adopted, the nematodes will persist if ryegrass is not substantially controlled for two seasons.

**Consequences of removing ryegrass**

Removing ryegrass from pasture can drastically reduce the amount of feed available to stock. This can result in reduced production per animal and a critical feed shortage in early to mid winter when pasture grasses constitute the early ‘green pick’.

These paddocks should be reseeded with an appropriate legume or legume mixture to overcome the loss of ryegrass and to ‘dilute’ the amount of ryegrass still in the sward.

To counter this feed shortage, more fodder may need to be conserved. Cereals can be planted for grazing during this period. Forrest barley is suitable as it makes vigorous early growth.

If a large number or all the paddocks on a property become affected by ryegrass toxicity, major management changes will be necessary and stock numbers will have to be reduced. Wool losses can be minimised by shearing in early spring before pastures become toxic. This may mean adjustments to mating and lambing times.

One advantage of removing ryegrass from paddocks is increased crop yields as a result of reduced competition for nutrients, moisture and a lower incidence of crop disease.

### Provision of safe paddocks

Safe paddocks can be pasture paddocks which are free of ryegrass, or which have been spraytopped at the right time to prevent

<table>
<thead>
<tr>
<th>Month</th>
<th>Treatment Description</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>May</td>
<td>Spray crops and pastures for ryegrass control</td>
<td>Destroys ryegrass and prevents build-up of toxic material. Also gives better crop yields. Improves pasture quality provided there is a reasonable legume base at spraying.</td>
</tr>
<tr>
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<td>Spray crops and pastures for ryegrass control</td>
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</tr>
<tr>
<td>July</td>
<td>Spray crops and pastures for ryegrass control</td>
<td>Destroys ryegrass and prevents build-up of toxic material. Also gives better crop yields. Improves pasture quality provided there is a reasonable legume base at spraying.</td>
</tr>
<tr>
<td>August</td>
<td>Graze pasture heavily</td>
<td>Ryegrass grazed while it is safe helps prevent gall and seed build-up.</td>
</tr>
<tr>
<td>September</td>
<td>Spraytop-graze at head emergence</td>
<td>Can salvage potentially toxic pastures for safe grazing and enhance cropping prospects for the following year.</td>
</tr>
<tr>
<td>October</td>
<td>Spraytopping</td>
<td>Reduces ryegrass seed set for following crops or pastures. Maintain stock levels after spraying.</td>
</tr>
<tr>
<td>November</td>
<td>Check stock daily (particularly in stubble paddocks)</td>
<td>Stock moved at the earliest signs of the disease do not usually suffer severe losses. Checking should begin in September in northern districts and early October further south. Never introduce hungry sheep into a “suspect” paddock. Feed them hay first.</td>
</tr>
<tr>
<td>December</td>
<td>Check stock daily (particularly in stubble paddocks)</td>
<td>Stock moved at the earliest signs of the disease do not usually suffer severe losses. Checking should begin in September in northern districts and early October further south. Never introduce hungry sheep into a “suspect” paddock. Feed them hay first.</td>
</tr>
<tr>
<td>January</td>
<td>Burn ryegrass to destroy seed and galls</td>
<td>Destroys nematode galls, bacterial galls and ryegrass seed.</td>
</tr>
<tr>
<td>February</td>
<td></td>
<td>Destroys nematode galls, bacterial galls and ryegrass seed.</td>
</tr>
</tbody>
</table>

Forrest barley is suitable as it makes vigorous early growth.
toxicity developing, and which have been subsequently grazed to control regrowth which can be toxic. In some seasons a second spray may be necessary if the ryegrass grows away strongly after late rains.

Ryegrass growing along fencelines, raceways, creeks, contour banks, rocky areas and dams can become toxic. Although treating these areas may be difficult, it should be attempted. In areas that cannot be traversed with a boomspray, a hand lead can be used for small areas; for larger areas misting with Hoegrass® is an alternative but is not recommended for broadscale spraying. Best results will be obtained when misting with Hoegrass® if high water volumes are used, spray oil is added and swaths are overlapped by at least 25 per cent.

Other safe paddocks include stubble paddocks which are free of ryegrass, or standing fodder crops in which ryegrass has been eliminated by herbicides. Peas, vetches and lupins can be grown as fodder crops using Hoegrass®, or oats can be grown using Glean®. Peas or vetches should be sown in a mixture with barley because the barley stubble will help protect susceptible soils against wind erosion.

A standing fodder crop is useful insurance when most paddocks on a property become affected by ryegrass toxicity and there is no ‘safe’ paddock for the stock until stubbles become available.

In the extreme situation, a small area incorporating a water supply can be fenced off and the sheep hand-fed.

Wongan Hills Research Station
Since 1982, the Department of Agriculture’s Wongan Hills Research Station has maintained a rigorous ryegrass control programme in line with the Department’s recommendations to farmers affected by ARGT. Because the farm is a research station, and this influences the overall management programme, the vigilance in tackling the ARGT problem has resulted in no stock losses attributable to the disease for three seasons. This has been despite seasonal conditions of the past four years favourable to growth of ryegrass, and the identification of yellow bacterial slime on ryegrass heads in spring.

As a result of stock losses from ARGT in the Wongan Hills district, sampling for ARGT started in 1975 on Wongan Hills Research Station. Paddock sampling in that year and early 1976 failed to find any evidence of nematode or bacterial galls.

Stock losses from ARGT were first reported from one paddock on the research station in November and December 1976. An adjoining paddock was also found to be potentially toxic. After intensive sampling in 1977, 11 paddocks were found to be positive for nematode galls only, but no stock losses were reported.

A ryegrass control programme, based on spraytopping with Gramoxone®, shallow autumn cultivation in cropping paddocks to encourage ryegrass germination and the use of specific herbicides in-crop, kept the disease in check until 1981. Dry years probably helped the control measures. Stock losses were again experienced in November 1981 from three paddocks. These paddocks had been destocked or lightly stocked over winter-spring to ensure adequate summer feed for trials.

Further paddock inspections and sampling in 1982-83 identified 13 paddocks as being potentially toxic. Eight were pasture paddocks and five were cropping paddocks in which ryegrass control had been poor. Twenty paddocks have been identified as being toxic at least once since 1976. The spread of toxic paddocks indicated that no paddock on the station could be regarded as being ‘safe’.

The ARGT management programme has concentrated on:
• Control of ryegrass in crops.
• Control of ryegrass in pastures in mid-winter (manipulation) using herbicides. This has been the main control measure in pasture. It is preferred to spraytop-graze because of improved pasture growth and seed set, and severe reduction in seed yield when newly sown pastures are treated with Gramoxone W® in early to mid September
• Reseeding pastures to legumes.
• Ryegrass control in raceways, firebreaks, fencelines, bush areas and around dams.
• Spraytop-graze of known potentially toxic paddocks and seed set control in other ryegrass pastures.