PLANT TOXICITIES IN SHEEP ON A PROPERTY WITH UNUSUAL WEED CONTROL PROBLEMS

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Summary

A large property in Manawatu had special problems with pasture and weed control because of its primary role in the commercial production of New Zealand flax (*Phormium tenax*). Sheep disease and mortality has been associated with toxicity due to goat's rue (*Galega officinalis*), tall fescue (*Festuca arundinacea*), reed canary grass (*Phalaris arundinacea*) and hemlock (*Conium maculatum*). With the phasing out of flax production and the introduction of cattle, it is expected that improved weed and pasture control will reduce plant toxicity problems.

INTRODUCTION

Some of the difficulties of combining very diverse forms of agriculture have been illustrated in the plant toxicity problems experienced over many years on a 2 000 ha Manawatu property. Until recently the primary role of the farm was the production of New Zealand flax (*Phormium tenax*). Animals were grazed between the flax but stocking practices, grazing management and weed control were largely dictated by the requirements of flax production. Because of the propensity of some animals to chew flax leaves and possible damage to plants by trampling, cattle were not grazed on the property. Many herbicides will damage flax plants and, therefore, chemical weed control was very limited.

The use of sheep to graze the pastures between flax plants on this property brought with it certain difficulties. The land involved is very low lying, old swamp country. Despite a major drainage scheme, much of the land is flooded for considerable periods each winter and, therefore, cannot be grazed regularly. The combination of these and other factors, acting over a period of 30 to 40 years, has resulted in a large build up of many weed species on this farm. Animal toxicity has been associated with goat's rue (*Galega officinalis*), tall fescue (*Festuca arundinacea*) and reed canary grass (*Phalaris arundinacea*) (known locally as bamboo grass). A probable outbreak of hemlock (*Conium maculatum*) poisoning has also occurred.

SHEEP TOXICITIES

Goat's rue

Goat's rue has been advocated as a fodder plant of considerable merit for many years in Europe and its cultivation and production potential have been described (Dona Dalle Rose 1948; Maymone and Regensburger 1959; Regensburger 1959). This is despite the long recognition of the potential toxicity of the plant to grazing livestock and the chemical characterisation of the toxin, galegine, as long ago as 1924 (Spath and Prokopp 1924).

The potential danger of goat's rue must have been recognised early in New Zealand. It was gazetted as a noxious weed in 1916 (Cockayne 1916) at which time its distribution was largely restricted to the beds

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Poisonous Plants

and alluvial flood plains of the Manawatu and Pohangina Rivers. Goat's rue is still very common in these areas and has probably been more widely distributed with the large quantities of shingle removed from these rivers and deposited on roads etc. throughout the region.

The first published report of goat's rue poisoning in New Zealand (Le Soeuf 1950) occurred in travelling sheep spelled on a portion of the property which is the subject of this article. A large quantity of goat's rue was eaten by the sheep and subsequently 43 of the 700 sheep died. The outstanding *post-mortem* lesions were excessive accumulation of fluid in the body cavities together with oedema and congestion of the lungs and liver. Goat's rue seeds were identified in the rumen contents of dead sheep. These findings are consistent with galegine toxicity (Morquer *et al.* 1952).

Staples (pers. comm.) has been able to kill sheep by the administration of dried seed pods or new growth foliage. However, Simpson (unpublished) failed to produce any signs of toxicity in caged sheep fed a sole diet of freshly picked goat's rue foliage for four weeks at two different times of the year. Observations by the farm manager suggest that poisoning occurs when plants are in flower or are bearing seed pods.

Tall fescue

Each year, for at least five years, up to 0.5% of sheep on this property developed gangrene of the lower parts of the limbs (Simpson 1975). Cases occurred almost exclusively during the winter and early spring and affected the hind limbs more often and more severely than the front legs. The type and distribution of lesions was similar to that seen in fescue poisoning of cattle (Cunningham 1949; Goodman 1952). Investigation revealed that in paddocks with affected animals there were large quantities of tall fescue. Because of its low palatability, tall fescue was generally not grazed by sheep until either, all other pasture was consumed or, as frequently happened in the winter, the water table rose above ground level leaving only larger plants such as tall fescue available. When this happened tall fescue became almost the sole diet and the toxic effects associated with its ingestion became apparent.

Reed canary grass

Toxicity of *phalaris tuberosa* (*Phalaris tuberosa*) is well documented, (McDonald 1942; Le Soeuf 1948; Milne 1955; Gallagher *et al.* 1964). On this property reed canary grass is prominent over quite large areas of pasture. An outbreak of *phalaris* toxicity in sheep, resulting in sudden deaths and inco-ordination has been recorded previously (Simpson *et al.* 1969). This episode was in a mob of sheep introduced, hungry, to a paddock with a large amount of reed canary grass in it. Further serious mortalities have not been encountered, although occasional sheep have been seen showing the gait characteristic of animals affected by *phalaris* toxicity.

Hemlock

An outbreak of apparent hemlock poisoning has been investigated on this property. Approximately 100 sheep died and 50 others showed signs of intoxication. When "driven" affected animals became "tucked up" in the abdomen and reluctant to move — the appearance was suggestive of abdominal pain. Fine muscle tremors were apparent in some sheep. *Post-mortem* examination of one recently dead sheep revealed extremely large kidneys, haemoglobinuria, intense uniform redening of the abomasal and intestinal mucosa and the presence of large amounts of hemlock foliage and stems in the rumen. Following the removal of sheep from access to hemlock no further animals became affected and all but three of those showing clinical signs recovered.

DISCUSSION

Commercial flax production from this farm has now stopped and the property is being developed as a stock unit. Flax is being eradicated from paddocks either by spraying with 2,4,5-T plus diquat and paraquat or by crushing with cattle. Aerial spraying has been quite successful. Trampling with cattle in mobs at about 12.5 cows per hectare for short periods intermittently is also a successful way of destroying the flax and is cheaper than spraying.

In addition, to destroying the flax, mob stocking with cattle has rapidly controlled both tall fescue and reed canary grass. Hemlock and goat's rue, however, have thrived under the changing management regime and it appears that herbicides will be needed to control them in the developing pastures. No major plant toxicity problems have been recognised in the cattle to date.

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