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Bracken fern poisoning in cattle

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ONE of the major problems facing farmers in the South-West of Western Australia is the hazard of bracken fern poisoning.

Attacking the problem has been made difficult first by lack of knowledge concerning the poison, its action, and treatment; and second the lack of a cheap and rapid method of eradication of bracken from infested paddocks.

Over the last decade some advances have been made in elucidating the overall picture and explaining the effects fern can have on different types of animals. A major step forward has been made in the development of a satisfactory economic treatment for affected animals.

Poison in the Fern

Work in England has conclusively shown that two poisons are present in bracken fern, these are:

1. Thiaminase—an enzyme which inactivates Vitamin B1 (Thiamine) and hence produces a Vitamin B1 deficiency in simple stomached animals such as the horse. This can be controlled by injections of Vitamin B1.

2. A fraction of bracken which is soluble in ethyl alcohol. This can be inactivated by steaming for one hour.

This fraction effects ruminants, particularly cattle and causes a depression of bone marrow activity.

Toxic Effects on Ruminants

The fern poison has a depressive effect on bone marrow tissue which in turn, causes a fall in the level in the blood of several types of cells.

The types affected mainly are:

1. Polymorphs—cells which are important in that they destroy bacterial invaders by digesting them.

   The pus seen in infected cuts is made up mainly of this type of cell.

2. Thromboctyes or platelets—these cells are necessary for the proper clotting of blood.

   About the time that these cells have almost disappeared from the blood stream, the small blood vessels (capillaries) become fragile and there is a tendency for spontaneous haemorrhage to occur.

   Depending on the toxicity of the bracken and the amount eaten by an animal, a chain of events could occur.

   The white cells disappear from the blood stream, and the animal then has a lowered resistance to infection. At this stage it appears likely that animals in the South-West used to die with pneumonia and perhaps septicaemia due to Pasteurella infections.

   In our experience it appears that other organisms also have invaded the animal, these organisms being the black-leg and entero-toxaemia groups. These have been characterised by the odd sudden death of a superficially healthy animal followed by rapid putrefaction.

   Trials at Deeside demonstrated that a high proportion of animals went through this phase but did not continue to the next stage of uncomplicated fern poisoning.

   The final stage of bracken fern poisoning is reached if an animal continues to eat enough toxic fern over a period, and the affected animal(s) have not already succumbed to infection.

   This stage is characterised by animals running a high fever which is not due to infection. The animals have characteristically drooped ears and sunken eyes and usually at least one of the group has stringy clear saliva running from the
mouth and some discharge from the nostrils.

These animals will usually continue to drink even if they do not eat. Sometimes clots of blood can be seen in the droppings of affected animals and occasionally strips of the lining of the intestine.

As the effects progress, the animals collapse from weakness and sometimes show abdominal pain by kicking at their bellies and grunting. At this stage the discharge from the nose becomes blood stained and the animals usually die. This may take from a few days to a fortnight.

Post-Mortem Examination

Features found can vary tremendously, the main constant characteristic being haemorrhage. If the animal died of some particular infection due to lowered resistance, then, of course, the post mortem findings are those of the organism involved—for example, pneumonia which may be due to Pasteurella.

These findings constant in simple fern poisoning are haemorrhages usually found on the outside of the heart, occasionally in the kidney but more commonly involving the intestines. The intestines themselves may be filled with blood clots. Also haemorrhages are seen on the walls of the paunch.

In advanced cases haemorrhages are also found under the skin.

TREATMENT

Until recently no specific treatment was available for affected animals.

Sulpha drugs and antibiotics were used to prevent bacterial invasion but recuperation of blood forming tissues could not be stimulated. However, recent English work has shown that a naturally occurring alcohol, dl-batyl alcohol, had a specific stimulating effect on bone marrow cells. This is now available in a commercial form as a proprietary preparation known as Bractol for intra-muscular injection and Bractol D for intravenous injection.

Bractol treatment was used in the Warren and Greenbushes areas in 1962 with excellent results, the cost of one injection (10 ml.) was one pound, which is much lower than the original price.

Generally, provided the animals had not started to show signs of haemorrhage from the nose or other areas something like an 80 per cent. recovery could be expected. Antibiotics or Sulpha drugs should be used at the same time. A feature of the treatment was not only the cure of the animals but also the rapidity of response, recovery taking a matter of days rather than weeks.

PREVENTION

With the break-through in treatment, more emphasis can be placed on preventive measures.

Vaccines

Pasteurella vaccines have been used with apparent success by cutting losses due to secondary bacterial invasion. This will of course not prevent uncomplicated fern poisoning.

Two types of vaccine are available:

(1) Killed Pasteurella suspension. This type has caused anaphylactic shock type reactions in animals. The number of animals affected has varied from property to property. It is characterised by uneasiness, slobbering, fast breathing, some abdominal pain with paddling which has ended in some animals coughing up froth and finally suffocating.

Recommendations for this vaccine are 1 c.c. followed by 3 c.c. a week later.

Adrenaline treatment has helped in most cases, 3 c.c. of 1:1000 adrenaline into the muscle being used.

(2) In an attempt to overcome the shock problem another type of vaccine in an oily base is now available. This is intended to give a very slow absorption over a long period of time.

However, this type of vaccine is prone to cause a high incidence of cold abscesses even when given intra-muscularly as recommended. This may not be a problem in replacement animals but would interfere with carcase value of animals sold for beef.
General

Various aspects of outbreaks of fern poisoning are puzzling. Why is it that some properties are more prone to the trouble than others? Why do some animals appear to remain quite healthy even when running in thick fern when others succumb when there is apparently only a light infestation of fern?

One fact is known: The younger the fern the more toxic it is. On this basis a large proportion of losses can be explained, fairly common situations being:

(a) Young animals in areas previously slashed or burnt.
(b) Young animals in infested paddocks cut for hay.

In both situations the fern is all young and appears to be particularly attractive late in the year when fern is the only green growth in a paddock.

To combat these situations it seems best to run calves in those paddocks with the least infestation of fern and to feed hay as much as possible to provide roughage in young lush pasture.

Avoid running young animals in the dry period in paddocks which have young fern in any quantity.

Obviously there are many questions yet to be answered which could help on the subject of possible seasonal or area variations in toxicity of the fern.

SUMMARY

- Bracken Fern contains a bone marrow toxin.
- This causes a lowered resistance to infection which apparently can be offset to some degree by vaccination.

  In the final stages, if enough fern is eaten—whether an animal is vaccinated or not—death due to uncomplicated fern poisoning with high fever and haemorrhaging will occur.

- Batyl alcohol injections plus antibiotics or sulpha drugs have given very good results in the treatment of fern poisoning.

- The danger of bracken fern poisoning may be minimised by cutting down the chances of young animals eating large quantities of young growing fern in a short time.

- The only final solution is complete eradication of bracken, but with the techniques now available, such as rolling and slashing, care should be taken with handling paddocks which are at the stages where virtually only young fern is present.
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