NSW GOVERNMENT Department of Primary Industries

primefact

Paralysis ticks and cattle

May 2020, Primefact 1372, Fifth edition

Animal Biosecurity and Welfare, NSW DPI

Introduction

Paralysis ticks, also called dog ticks, shell-back ticks or scrub ticks are a serious parasite occurring on the East Coast of Australia. They inject a toxin causing paralysis that can be fatal in domestic animals, both pets and livestock. The toxin can also affect humans.

Paralysis ticks are native to Australia and their natural hosts are marsupials, principally bandicoots, but also others such as echidnas, possums and wallabies. They also infest cattle, horses, sheep and goats and domestic pets. Native animals are usually immune to the paralysing toxin because of their frequent exposure to tick infestation. However, they maintain a reservoir of paralysis ticks in a particular area. Paralysis ticks tend to be associated with bushy or scrubby areas which harbour the native animal hosts but they can still be picked up in open paddocks and other areas.

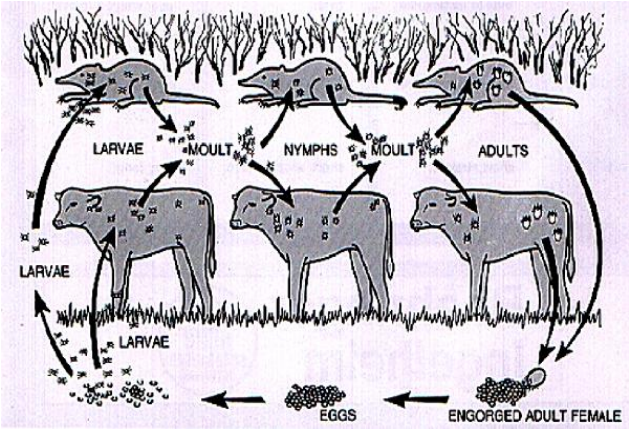
The three main ticks of concern in NSW are the paralysis tick, the bush tick and the cattle tick. Heavy burdens of paralysis ticks are rare and they are usually present in mixed infestations with bush ticks. Cattle tick infestation is a notifiable disease in NSW. Information on identifying ticks can be found in the Primefact 84 Ticks of concern to NSW stockowners and in Appendix 1.

Life cycle of the Paralysis Tick

Paralysis ticks are a three-host tick. This means that the tick must attach and feed on a new host (of the same or a different species) on three separate occasions in order to complete its life cycle. The three stages of the tick's life cycle that can be found attached to animals are:

- pinhead sized larvae ('seed ticks')
- match-head sized nymphs
- match-head to pea-sized adult females

Life cycle: Paralysis ticks are "three-host ticks" – they drop from their host and re-attach to a new host each time they moult.



A very thorough inspection of an animal is required to find larvae, nymphs or un-

engorged adult ticks. While engorged adults are generally easy to see, they can attach in places such as between the hooves or cavities such as the nostrils, anus, vagina or the ears. When the fleece or hair is long they can be very hard to see and can often be felt with the fingers as lumps as they are firmly attached.

The parasitic phase occurs when ticks attach to a host and suck blood. Each of the three separate stages of this phase lasts about a week. After feeding, the larvae and nymph ticks drop off onto the ground and must moult before they are able to attach to another host. Paralysis ticks spend a much longer time on the ground than they do on animals.

Paralysis ticks can be found on hosts at any time of year. However adult ticks are most commonly seen from July through to December with a peak of young adults in spring. When the fully engorged female paralysis ticks drop, they lay 2000 - 3000 eggs, then die. With moist, warm conditions, most of these eggs will hatch within seven to nine weeks. The resulting larvae tend to infest hosts in late summer and autumn. These drop and moult to nymphs which infest animals in late autumn and winter. While most tick development follows this pattern, there is enough variation that small numbers of adult ticks can be found at other times of year.

Free living stages can survive on the ground for extended periods. Unfed larvae can remain alive for five months while eight-month-old unfed nymphs have been shown to be still infective. Free living stages are particularly susceptible to dry conditions. Temperatures above 32°C delays development or kills the tick, while temperatures below 7°C for a few days can kill unattached adults. A good cover of mulch on the ground provides ideal conditions for eggs to develop and hatch and for the survival of larvae. Of the free living stages, unattached adults have the shortest potential for survival. The number of ticks is generally determined by rainfall during the previous year.

Effect on animals

The salivary glands of the tick produce a toxin that affects the nervous system of the host. Larvae and nymphs secrete small quantities of this toxin when they feed but it is the larger amount injected by adult females that most commonly causes paralysis. Paralysis begins with a loss of coordination in the hindquarters. It spreads at varying rates throughout the body, eventually affecting breathing when the chest muscles become involved. Once paralysis occurs the animal is likely to die unless it is treated with anti-tick serum by a veterinarian. Where this treatment is delayed, additional supportive treatment will also be needed to save the animal.

Young calves, because of their low bodyweight and lack of previous exposure to ticks are particularly susceptible to paralysis. Experiments have shown that it requires more than two ticks to cause paralysis in 2 - 3 week old calves. It is also common for ticks to have dropped from the animal before symptoms of paralysis become apparent. As the calves gain weight, progressively more ticks are required to have an effect. Cattle run in "ticky areas" usually develop a degree of immunity to the toxin, but the role of maternal antibodies in milk (if any) in protecting the calf from paralysis is unclear. Exposed cattle also develop a resistance to

infestation that results in ticks, especially larvae dying before they are able to engorge. Occasionally, heavy infestations of paralysis tick can lead to the death of adult animals.

This generally only occurs with cattle introduced from tick-free areas in spring when the availability of paralysis ticks on pasture is likely to be high.

Controlling Paralysis Ticks on calves

Paralysis ticks are very difficult to control because:

- they are only attached to animals for a short period of about a week,
- each non-parasitic stage may survive for up to nine months on the ground,
- they can attach to native animals which cannot be treated with tickicide,
- currently registered tickicides are difficult to apply and only have minimal residual activity, and
- calving time often coincides with the period of peak tick availability.

Three approaches to controlling the problem in calves:

- Kill ticks before they can inject a lethal dose of toxin.
- Reduce the opportunity for ticks to attach
- Reduce their susceptibility to paralysis ticks.

There is no one-size-fits-all solution that will be acceptable or practical for all producers. However, there are a number of things that can be done (to a varying degree) and it is up to individuals to decide which of these they can apply to their enterprise.

1. Chemical treatment of calves before ticks can inject a lethal dose of toxin

There are a range of chemicals that are registered for controlling paralysis ticks. These products are applied as dips or sprays or as slow release insecticidal ear tags. There are no pour on products registered for controlling paralysis ticks. While ear tags can provide protection for up to 42 days, the dips and sprays are not persistent chemicals and protect for only a short time.

This means that more frequent treatments or other management strategies will need to be implemented to obtain the same level of tick control.

As the number of operational plunge dips has declined over recent years, most producers will have to rely on spray treatments or ear tags for chemical control of paralysis ticks. It is essential that the spray thoroughly wets the entire animal in order for it to be effective. A tick attached to an area missed by the spray will not be killed.

In the case of heavy infestations or challenge, regular treatments at intervals as short as one week may be needed. Careful management is required to ensure that the manufacturers recommended Withholding Period (WHP) and Export Slaughter Interval (ESI) are followed to avoid unacceptable residues.

There are a number of pour-on chemicals registered for control of cattle tick which currently have no claim for controlling paralysis tick. These are the macrocyclic lactone endectocides and the insect growth regulator (IGR) Acatak®. Their main use is in strategic eradication programs rather than as a curative treatment. Both of these chemical groups offer reasonably long residual activity but in principle they require cattle ticks to fully engorge in order to get a lethal dose of

chemical. With paralysis ticks this may not occur until after the ticks have injected a lethal dose of toxin into an animal.

Some producers rely on alternate therapies such as external application of sulphur or oil of turpentine for tick control. There is no scientific data on the effectiveness of these treatments. Use of unregistered products by oral dosing or injection pose both residue and animal welfare risks and are not permitted under the *Stock Medicines Act*.

> ***ALWAYS READ THE LABEL***
>
> *Users of agricultural (or veterinary) chemical products must always read the label and any Permit before using the product, and strictly comply with the directions on the label and the conditions of any Permit. Users are not absolved from compliance with the directions on the label or the conditions of the permit by reason of any statement made or not made in this publication.*

2. Strategies to reduce the possibility of ticks attaching to calves.

This approach revolves around identifying paddocks that have a low population of native hosts, particularly bandicoots. Generally, these are low risk paddocks for paralysis ticks and are more suitable for young calves.

Treating cattle infested with paralysis ticks, particularly adult ticks, before they move onto these low-risk paddocks is likely to keep the tick population on the pasture low.

If significant infestations have occurred in these paddocks in the past it is most likely that cattle were the main host. Treatments of the cattle in these paddocks would reduce the level of infestation but it is impractical to eradicate the tick population as this would require weekly treatments over an extended period with the currently-registered, short-acting tickicides.

Because dead grass or mulch provides ticks with a buffer against environmental extremes, pasture management strategies (eg, slashing) that expose free living stages of the tick to dry conditions and extreme temperatures will aid in the control of paralysis ticks. There are no chemicals available to treat pastures to kill free-living stages of the tick. Larger and older animals, particularly those with previous exposure to paralysis ticks should be run in higher-risk paddocks, especially during spring and early summer.

3. Reducing the susceptibility of calves

Young calves are most susceptible to the effects of paralysis ticks. Many herds calve at a time when the challenge from ticks is greatest. By calving the herd earlier the calves will be heavier when subjected to the greatest challenge and will require a larger number of ticks to have an adverse effect.

Even though individual animal susceptibility varies, it is generally believed that herds with 50 per cent or more *Bos indicus* blood have less of a problem with paralysis ticks than British breed herds. This is more likely to be a result of tick resistance rather than an innate resistance to the tick's toxin.

More Information

Talk to your private veterinarian or LLS for further information on tick fever.

For biosecurity general enquiries, phone 1800 680 244 or email animal.biosecurity@dpi.nsw.gov.au

For information on cattle ticks see:

https://www.dpi.nsw.gov.au/animals-and-livestock/beef-cattle/health-and-disease/parasitic-and-protozoal-diseases/ticks

Acknowledgments

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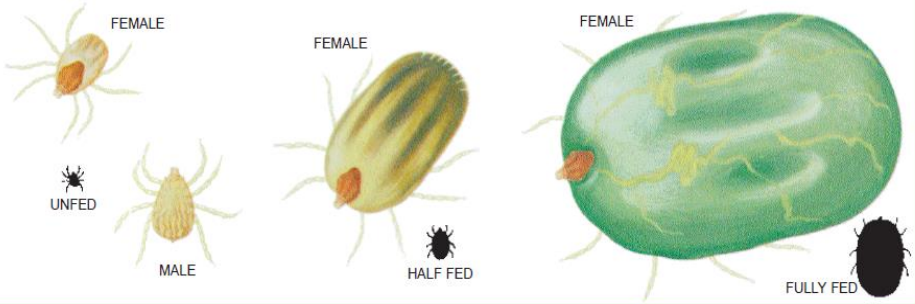
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Cattle Tick

Larva: SNOUT is short and straight;
BODY is brown to cream.

Nymph: LEGS are pale cream;
BODY is oval but wider at the front, brown to blue-grey and white at the front and sides;
FACE is orange-brown.

Adult: LEGS are pale cream with a wide space between the first pair and the snout;
BODY is oval to rectangular, grey-brown to dark green-grey;
FACE is diamond-shaped and dark brown.



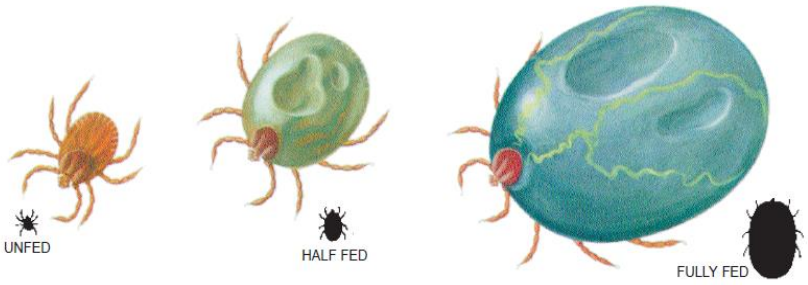
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Bush Tick

Larva: SNOUT is short and wider at the face;
BODY is brown to dark blue-grey.

Nymph: LEGS are dark red-brown;
BODY is oval and dark brown to dark blue-grey all over.

Adult: LEGS are dark red-brown and the first pair are close to the snout;
BODY is oval-shaped and dark red-brown to dark blue-grey;
FACE is oval and dark brown.



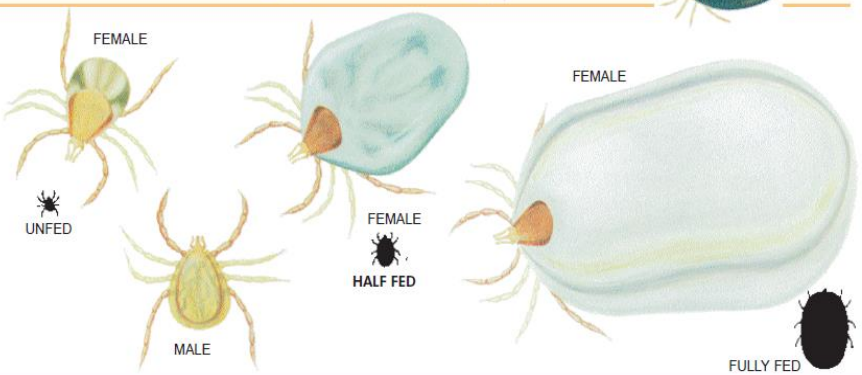
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Paralysis Tick

Larva: SNOUT is very long;
BODY is pale grey to very dark blue-grey.

Nymph: LEGS are light orange-brown;
BODY is pear-shaped to round and light grey to very dark blue-black.

Adult: LEGS form a v-shape line from the snout down the sides of the body; the first and last pair of legs are brown and the second and third pair are pale;
BODY is pear-shaped to oval and yellow-grey to light grey with a dark band on the sides;
FACE is oval but wider at the rear and brown;
SNOUT is very long.



Tick activity scale
LOW HIGH