



# technical brief

## **Bulls and Tick Fever Vaccination.**

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Bull breeders sending bulls into the “ticky” regions of Queensland, Western Australia and Northern Territory **should vaccinate these animals against tick fever**. Buyers paying for ‘preferred’ genetics will be looking for some insurance that a purchased bull makes it past its first encounter with the local cattle ticks.

Most bull breeders within the tick areas, or regular suppliers into the tick areas from outside the tick line will be well aware of the need to vaccinate bulls as weaners; but what do you do if you are an irregular supplier into the tick area bull market?

**A little background:** Tick fever is a serious disease of cattle transmitted by the cattle tick. There are three organisms involved – *Babesia bovis*, *Babesia bigemina* and *Anaplasma marginale*. The disease can cause marked weight loss, abortion, reduced fertility in bulls and death in some cases. It is often called “red water” (ie. red urine) because of the type of red blood cell breakdown that the first two organisms cause. About 80% of the outbreaks we see are caused by *Babesia bovis*.

There are several key elements that bull breeders must understand about this disease:

1. **Breed** As the European and British breed content increases, so too does the risk of tick fever i.e. a pure bred European or British animal is much more susceptible to tick fever than a cross-bred, which in turn is more susceptible than a pure-bred Brahman. Note this is not the case with *Anaplasma - Bos indicus* cattle are almost as susceptible to this organism as other breeds.
2. **Breed x Geographic origin interactions.** The most susceptible animals are British and European breed genotypes bred in the tick free areas of Australia. *Bos indicus* genotypes grazed in the coastal plains inhabited by ticks are the least susceptible because of natural breed resistance and tick exposure as calves. The message is of course not this simple, but is a good start. Suffice it to say that all bulls should be vaccinated regardless of breed or origin.
3. **Tick fever causes just what it says – a fever.** This can be very damaging to production and maturation of sperm in the testicle and also result in abortion or embryo loss.
4. **Weaners (approx age of 3-9 months) have a natural resistance to tick fever.** Weaners are rarely affected by tick fever, even under quite heavy challenge from tick fever field infections.
5. **Vaccinating against tick fever is the most reliable method of protecting cattle against the disease with immunity being long-term, usually life-long.**

6. **The tick fever vaccine is an attenuated (ie. made mild) live vaccine derived from parasites isolated from field cases.** Although in most cases, there is no clinical effect of the vaccine, it is not completely devoid of risk and sometimes causes a reaction. **Weaners rarely show any reaction to the vaccine.** The risk of a reaction to the vaccine (just as with normal tick fever) increases in animals vaccinated as yearlings or adults, and as the *Bos indicus* content of the cattle decreases. Bulls also appear to be more susceptible. The usual reaction is a very mild form of this disease - maybe a small temperature rise, some reduction in red cell count (that is, slight anaemia) and perhaps some reduction in weight gain. In some animals however the reaction is more severe, and the animals must be treated just as if they had the disease itself. It is an unfortunate fact of life that if we take all the “sting” out of the vaccine (which we can do), it loses some of the ability to protect against the variety of tick fever parasites the animal may encounter in the field.
7. **Vaccine reactions occur between 7 – 21 days for *Babesia* and 30 – 60 days for *Anaplasma*.** This means that monitoring for vaccine reactions, and the effect of vaccine reactions, can take place for 2 months from the time of vaccination. **Weaners need little if any monitoring after vaccination.**
8. **We recommend that bulls that are vaccinated at a mature age should be monitored very closely (even to the extent of a daily temperature check in very valuable animals during the high risk reaction period of 12 – 21 days).** Although the incidence of sustained high fever and other vaccine reactions is low, the effect on individual bulls may be quite marked in terms of appearance for sale and fertility.
9. **It takes about 3-4 weeks after vaccination to develop immunity to the *Babesia* organisms and about 2 months to develop immunity to *Anaplasma*.** Bulls moving into tick areas that had not been previously vaccinated should be vaccinated at least 2 months prior to movement.
10. **Larval ticks transmit *Babesia bovis*.** Therefore bulls vaccinated at the time of entry to tick infested areas must have larval ticks kept off them for at least 3 weeks while immunity to the vaccine develops. **KEEPING LARVAL TICKS OFF CATTLE IS NOT EASY.**

## SO WHAT ARE THE OPTIONS?

1. **Only vaccinate bulls that are heading for the tick areas.** This could be done on the sale property and the bulls held while immunity develops or once the bulls get to the destination.

**Pros:** The vendor is not concerned with general vaccination of all bulls against tick fever. It is a major selling point to prospective purchasers if bulls are solidly protected prior to introduction to a tick area.

**Cons:** Vaccinating sale age bulls increases the risk of vaccine reactions, which may have a temporary affect on fertility. The responsibility of monitoring for vaccine reactions will lie with the vendor if vaccinated bulls are held on the sale property until solid immunity develops.

Alternatively if bulls are to be vaccinated upon entry to the tick area, the bull buyer will need to monitor animals during reaction periods, keep animals free of larval ticks at least 3 weeks after vaccination (time consuming and difficult to achieve) and will not be able to use the bull for about 2 months at least after purchase while immunity develops.

## **2. Vaccinate bulls prior to sale.**

**Pros:** Only bulls identified for sale are vaccinated

**Cons:** There is a risk of vaccine reactions in older bulls which may affect appearance at sale (weight loss) and have a temporary effect on subsequent fertility. At least a 2 month lead-in time prior to a sale is necessary to allow solid immunity to develop in vaccinated bulls. Vaccine reactions may also affect results at pre-sale bull breeding soundness examination.

This last point is important – we know that we should allow about 10 weeks for bull semen to return to normal after an insult (illness, fever etc) as this allows all sperm in the system at the time of the insult to be replaced. This usually means that bull sellers are advised to test bulls some months before sale to allow time for retest if there are any doubtful results. If we say bulls are sold at 20-24 months of age, bull breeding soundness examination might occur at age 17-21 months or earlier. It is important to note then that bulls vaccinated prior to the bull breeding examination might also have a vaccine reaction which might affect weight, testicular tone and semen morphology.

It makes sense then that bulls should be vaccinated before this time to reduce the risk of vaccine reaction affecting fertility and weight gains at the time of breeding soundness examination and sale; and to allow plenty of time for recovery if that does occur.

The logical extension is...

## **3. Vaccinate bulls as weaners**

**Pros:** There is little chance of a vaccine reaction.

There is little need to monitor vaccinated animals during the reaction period – this can be a considerable effort when vaccinating older yearlings and sale age bulls.

Animals are sold ready to work in any environment.

**Cons:** Some animals are vaccinated unnecessarily.

## **SOME UNCERTAINTIES**

### **Should we vaccinate the bulls a second time?**

We know that once the animal develops immunity that it is likely to be lifelong. This immunity may also be boosted by challenge from field strains of parasites encountered through tick bites.

Our experience and extensive trial work tells us that a small number of cattle will not become immune to one or other of the organisms in the vaccine, but we expect greater than 95% of animals to be immune to each of the organisms. So after one vaccination, a few animals will not have protection against all three organisms. **We recommend a booster vaccination in valuable animals like bulls particularly if they are born and raised in the cattle tick free area. Ideally, this should be given some months prior to a sale.**

### **What is the risk of a vaccine reaction when giving a booster?**

For bulls that have developed immunity to all three organisms from previous vaccination, the risk is nil. For the very small number of bulls that have not developed immunity to one of the organisms, then the risk is the same as if they were encountering that organism in the vaccine for the first time. All other conditions apply – the age of the animal, the breed and so forth. These animals however would also be very susceptible to a field infection of tick fever.

## SUMMARY

To prevent any side effects of vaccination such as a loss of condition and reduced fertility during the reaction period, the practice of one-off vaccination (also known as ‘bleeding’) of calves between 3–9 months of age is advocated; young animals show little or no reaction to the vaccine, yet develop a strong, lasting immunity.

### **The benefits of early vaccination:**

- **Cattle solidly protected against tick fever prior to a sale; if revaccination is a condition of sale, the risk of reactions is minimal.**
- **No need to worry about keeping animals tick-free prior to and shortly after vaccination when being introduced into ticky country.**
- **No risk of vaccine reactions affecting the animals’ presentation at the time of the sale.**
- **No concerns about having to move vaccinated cattle during reaction periods when stress should be kept to a minimum.**

## SOME HOUSEKEEPING MATTERS

Tick fever vaccine can be used in all Australian States but conditions apply in New South Wales and Victoria. Contact the relevant Departments of Primary Industries for details.

Vaccinated cattle can be moved anywhere in Australia without restriction except in the Cattle Tick Protected Area in Northern New South Wales (contact the NSW DPI for details).

Some countries do not allow the importation of tick fever infected cattle and these restrictions also apply to vaccinated animals. So, if you sell cattle overseas, check for any restrictions before vaccinating the cattle.

In Queensland, vaccine can be ordered through local stock and station agents, private veterinarians or directly from the Tick Fever Centre (TFC).

For more information on vaccination against tick fever -

Information kits are available from TFC and Qld DPI&F offices

Instruction leaflet is provided with each order of vaccine

Visit the Qld DPI&F website: [www.dpi.qld.gov.au/tickfever/](http://www.dpi.qld.gov.au/tickfever/)

Contact the Tick Fever Centre

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