

LIVESTOCK HANDLER TRAINING MANUALS

MODULE 3: SEASONAL PLANNING

Tick-borne blood parasites



Managing deadly tick-borne blood parasites.

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Developed by Dr Danie Odendaal

Disclaimer

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INTRODUCTION

This manual forms part of Afrivet's series on primary animal health care (PAHC) for small stock and has been developed to help the veterinarian, animal health technician, livestock owner and livestock handler to understand the methodology used when implementing PAHC and production management.

These manuals are ideally suited as practical training aids for training livestock handlers in the principles of planned production management, disease prevention and early disease identification.

The information contained in this manual is a summary of the material used by Afrivet Training Services for the formal training of animal health technicians, extension officers, livestock farmers and livestock handlers.

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Tick-borne diseases cause the death of thousands of cattle every year. Most of these deaths are preventable by early identification and treatment

When dealing with cattle susceptible to tick-borne diseases, time is of the essence to prevent huge losses.

The highest risk for tick-borne disease is when there are a very high number of blue ticks, such as during summer and especially the autumn.

The transmission of these diseases is complex and it is important to consult a veterinarian about the correct dipping interval for the prevention of disease in susceptible cattle in your area.

The livestock handler needs to be on high alert for the first signs of disease, as tick-borne diseases can cause death within 24 hours after the first signs appear.

Challenges faced in controlling tick-borne blood parasites

- Cattle can build up immunity against tick-borne diseases if they are exposed to these diseases through infective tick bites or vaccination before the age of six to nine months.
- Young (older than six to nine months) or adult cattle that do not have immunity against these diseases, could develop a potentially fatal disease if they become infected.
- Most sick animals will die if not treated in time.
- Usually, multiple cattle become infected at the same time. Therefore, you can expect a disease outbreak after the first animal becomes sick.
- Tick control by means of dipping and spraying will not prevent the disease if transmission took place before treatment.
- It is very difficult for the farmer to distinguish between the different tick-borne diseases.
- A veterinarian can only make a diagnosis of the specific disease by examining a blood smear or the fresh carcass of a dead animal.

In the PAHC approach, the livestock handler must understand the practical challenges involved with each important disease.

Opportunities for better control of tick-borne blood parasites



- Cattle can acquire good immunity if they are vaccinated with the relevant blood vaccine before the age of six to nine months.
- Good knowledge of the disease process is required for successful prevention of these diseases through tick control in cattle that do not have an acquired resistance.



- Effective daily observation and immediate closer examination of animals showing the first signs of disease are the only opportunities livestock handlers have to identify diseased animals in time for treatment.



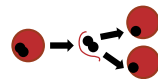
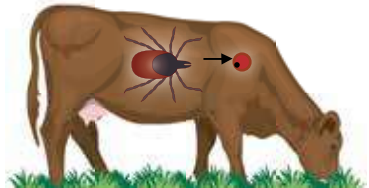
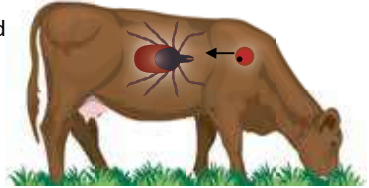
- The correct broad-spectrum remedy must be available for immediate and effective treatment against these diseases.
- If an animal dies and a veterinarian makes a specific diagnosis, the rest of the susceptible herd can be treated to prevent a disease outbreak.

Limiting losses owing to disease is based on a good understanding of the disease process, which provides the opportunity for prevention or early treatment.

Transmission of tick-borne blood diseases

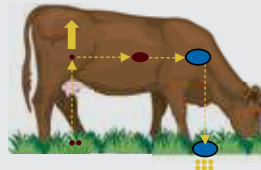
Ticks can transmit different diseases from one animal to another. In this training manual, we focus specifically on the diseases that infect and destroy the red blood cells (●●●) of cattle.

- These diseases are caused by tiny blood parasites called *Babesia* or *Anaplasma* (●●●).
- Blood-sucking ticks become infected with the blood parasite when they feed on an infected animal.
- These blood parasites develop and multiply inside the tick, and high numbers of the parasites end up in the saliva glands of the ticks.
- When ticks feed on cattle, they inject some saliva to prevent the blood from clotting. In this way, the blood parasites are injected into the blood stream of cattle.
- Once in the blood stream, these blood parasites penetrate the red blood cells where they divide and infect more red blood cells.
- Infected red blood cells either burst or become deformed, and are effectively destroyed. This leads to internal blood loss causing a shortage of oxygen in the body.



Asiatic redwater

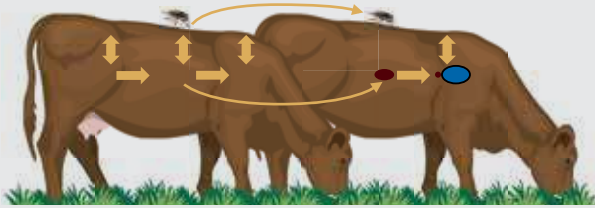
- This disease is only transmitted by the very small larvae of the pantropic blue tick.
- These larvae can transmit the disease from day one after attachment, when the larvae start to suck blood.
- In practical terms, this means these ticks can start to transmit the disease one week after dipping.
- The period over which the parasites develop in the red blood cells of cattle lasts for one to two weeks before the first signs of disease can be observed.



Note: Review the lifecycle

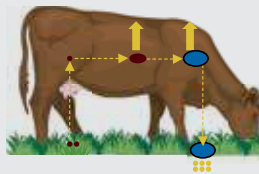
Anaplasmosis (tick-borne gallsickness)

- This disease is transmitted by blue ticks, several other types of ticks, biting flies – even needles or other bloodstained instruments.
- This disease is not transmitted to the next generation of ticks through the eggs. Therefore, blue ticks feeding on cattle will pick up the disease while feeding and then transmit it to other cattle.
- The period over which these parasites develop in the red blood cells of cattle is four to six weeks before the first signs of disease can be observed.



African redwater

- This disease can be transmitted by the ordinary blue tick and the pantropic blue tick. These two types of blue ticks look the same and can only be distinguished under a microscope.
- The disease is transmitted from day nine after infestation by the nymphs and adult ticks.
- In practical terms, it means that the disease can only be transmitted from the second week after dipping.
- The period over which the parasites develop in the red blood cells of cattle lasts for two to three weeks before the first signs of disease appear.



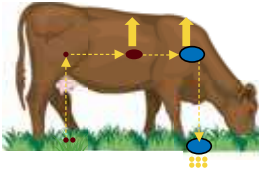
e and seasonal occurrence of blue ticks.

African redwater – the disease

An example of the disease development process of a tick-borne blood parasite

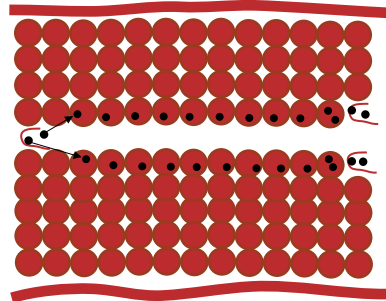
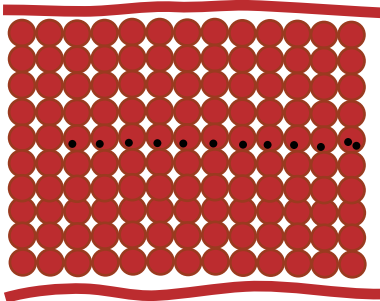
Start of infection

The blood parasite (*Babesia bigemina*) is transmitted by the nymph and adult stages of the blue tick when it sucks blood from the animal.



Week 1 – 2

For the next two weeks, the animals will show no sign of disease and will behave, eat and walk normally.



The blood parasite will enter the small blood vessels in the skin with the spit (saliva) of the tick when it sucks blood.

It will then enter a red blood cell where it will grow and divide.

In this process, it will destroy (burst) the red blood cell and the two parasites formed will now enter two new red blood cells.

Initially, only a very few red blood cells will be infected (fewer than 1 in 100).

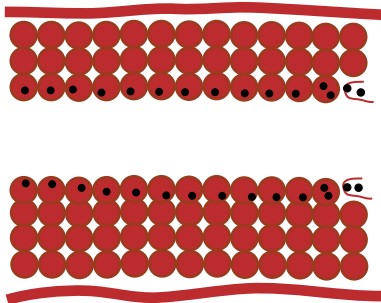
Over these two weeks, the blood parasites will multiply and infect more and more red blood cells. Infected red blood cells burst, leading to blood loss (anaemia). The liver or kidneys must now disperse of the red content of the burst red blood. The animal's own immune system now starts to react against the infection, giving rise to a fever.

Disease development process

site causing destruction of red blood cells leading to blood loss.

>2 Weeks

Infected cattle suddenly develop general signs of disease: they stop eating and chewing the cud, heads and ears hang and they become reluctant to move. More specific signs such as difficult or faster breathing and **red-brown urine** now become apparent.



The animal's fever will rise to over 40°C at least two days before visible signs of disease appear.

The animal copes with the blood loss up to a certain point when there are just too few red blood cells left for the animal to carry enough oxygen to the rest of the body cells. The animal will show sudden weakness and when examined, the inner eyelid will be white. The animal normally dies within 24 hours after advanced signs of disease.

Diagnosis of infection in the live animals

The veterinarian examines the animal by taking the temperature, listening to and determining the heart and respiration rate, and looking at the inside eyelid. He/she will make a blood smear for examination under the microscope to identify the parasites in the red blood cells.



Examination of dead cattle



The veterinarian will look for many signs including signs of blood loss, liver and kidney damage and the colour of the urine in the bladder. A blood smear will also be examined to confirm a final diagnosis.

Structured daily observation

The challenge

- Although these diseases develop over a long time, the cattle can die within 12 to 24 hours after the first signs of disease.
- If you miss these signs, you will only realise that there is a problem once the first animal lies dead.



First and advanced signs of disease - African redwater

	Behaviour	Fall behind when herding and stands a lone		
	Ears	Hang		
	Eyes			
	Nose	Dry		
	Mouth			
	Condition			
	Skin/hair	Ruffled		
	Rumen fill	Hunger groove sunken in		
	Backline			
	Breathing	Fast breathing	Movement of chest and abdomen when breathing	
	Drinking			
	Eating	Eat less	Stop eating	
	Chewing			
	Swallowing			
	Urine	Dark yellow urine	Red urine	
	Dung	Diarrhoea		
	Udder and teats			
	Testicles and sheath			
	Vulva	Abortion		
	Standing	Unsteady		
	Front legs and feet			
	Lying	Don't get up		
	Tail			
	Back legs and feet			
	Walking	Does not want to move		

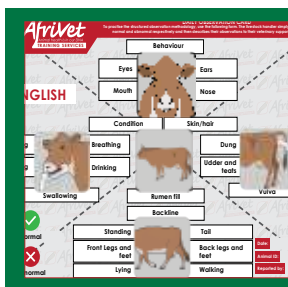
Structured daily observation forms the basis of PAHC. With this unique observation model, the normal working of every body system can be evaluated daily.

First and advanced signs of disease during the development of African redwater as an example.

- The first signs by observation only are not very specific.
- The signs are mostly general. For example, the animal will be standing alone or falling behind when herded. Also, decreased appetite and a sunken hunger groove are signs of fever.
- Red-brown urine is the only specific sign of disease observed in the case of African redwater. (For the other two diseases, Asiatic redwater and anaplasmosis, there are no specific signs of disease observable).

Immediate closer examination of animals showing general signs of disease.

Because these diseases cause blood loss, it is extremely important to examine them at the first sign of disease because they need to be taken to a crush pen for an examination. If the blood loss is already advanced, the handler will not be able to herd them to a



The opportunity

Afrivet Training Services have developed the Daily Observation Model specifically to enable livestock handlers to observe the first signs of disease through a structured model and then to do a closer examination once the first signs of disease appear.

Closer examination

At the first signs of disease, a closer examination is required using the following methodology:

1. Take the animal's temperature.
2. Examine the inside lining of the eyelid.
3. Examine the rest of the body.



To examine cattle properly, they need to be constrained in a crush pen. This is in many cases the limiting factor in early disease identification and treatment.

1. Take the animal's temperature



- The thermometer is the only diagnostic tool available to the livestock handler.
- Use an electronic or mercury thermometer.

- Livestock handlers must be trained in taking temperature and have a thermometer with them at all times.
- When using a mercury thermometer, the reading is a specific skill that must be taught.

$$40 + .5 = 40.5^{\circ}\text{C}$$



In the case of African redwater, the temperature will be 40°C and higher as soon as the first signs of disease appear and the animal is examined.

2. Examine the lining of the inside eyelid

The colour of the inside eyelid gives an indication of the status of the blood supply. The normal colour of the inside eyelid is pink.



The correct way to open the eye to examine the colour of the inside eyelid:

Lift the thick eye bank with the fingers.



Close the top eyelid with the thumb.



Gently push the eye bulb in.



With the other thumb pull the lower lid down until the inner eyelid bulge out or is clearly visible.



In the case of African redwater, the inner eyelid will be white, which is a sign of severe blood loss.

3. Examine the rest of the body

The rest of the head and body are then examined as part of the complete examination – no extra signs of disease can normally be seen in the case of African redwater.



Treatment of sick animals

Immediate treatment with an injectable product is essential against all three tick-borne diseases that cause blood loss.

- Upon identifying the disease during examination, the blood loss is already severe.
- The treatment will only kill the blood parasites such that they don't infect and destroy more red blood cells.
- Only the animal can correct the blood loss when it produces new red blood cells. However, this may take a number of days (> 1 week).
- A fever and white inside eyelids are signs that the animal is infected by a blood parasite but it doesn't tell the specific cause. Only a veterinarian doing an examination of a blood smear can determine the cause.
- To treat animals in an emergency, it is advisable to use a product that is effective against all three diseases namely: African red-water, Asiatic red-water and anaplasmosis.
- It is advisable to treat the rest of the susceptible animals that do not yet show signs of disease. Consult with a veterinarian who will consider all factors before deciding upon a treatment.

Broad-spectrum antibiotics such as tetracycline are not effective when treating cattle that already show signs of redwater. If redwater is the cause of disease, a specific product that is effective against this disease must be administered immediately.

ULTRATET

ANTIBIOTICS TETRACYCLINES
INJECTABLE

Reg No. G0296 (Act 36/1947)
NSO V03/17.1.2/698

Oxytetracycline 125 mg/ml

Treatment of tick-borne gallsickness (anaplasmosis), heartwater, pneumonia, footrot, joint-ill and navel-ill in cattle, sheep, goats and pigs as well as strangles in horses.

Withdrawal period:

Meat: 28 Days

Milk: 5 Days

Administration: IM or SC



Packaging available

100 ml, 500 ml



Registration holder: ECO Animal Health Southern-Africa (Pty) Ltd Co. Reg. No.1992/000835/07

 8 ml / 100 kg  4 ml / 50 kg  1 ml / 25 kg  4 ml / 100 kg



The other tick-borne disease not discussed in this module is heartwater, which affects cattle, sheep and goats. This disease, transmitted by the bont tick, doesn't cause blood loss, but does cause other signs of disease including fever. Consider heartwater when using broad-spectrum treatments against tick-borne diseases when the veterinarian has not made a final diagnosis yet.

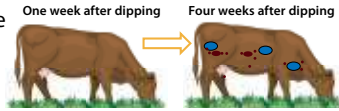


Prevention in susceptible cattle

Susceptible cattle can be protected against the transmission of tick-borne diseases through regular dipping. All the different stages of the blue ticks are killed when the cattle are dipped with an effective dipping compound.



One week after dipping, most ticks will be dead and the dip will protect the cattle during that week against new infestation from ticks at all stages of the lifecycle.



A new infestation of blue tick larvae will survive and attach from one week after dipping, giving rise to adult blue ticks four weeks after dipping.



The only way to prevent the disease transmission is to treat against ticks every week. Do this when there is a high blue tick infestation and when the cattle are susceptible to these tick-borne diseases.

If the cattle are resistant against these tick-borne diseases, the dipping interval can be changed to control the tick population but not specifically to prevent disease transmission. Consult a veterinarian in this decision because it will also involve the correct use of blood vaccines to build up immunity.

TREATMENT OF EXTERNAL PARASITES WITH PLUNGE DIP/SPRAY

ERADITICK 250

Reg No. G4047 (Act 36/1947)

Amitraz 25 % m/v

Controls ticks and kills lice and mange mites on cattle. Controls ticks, controls sheep scab mites and kill itch mites and goat mange mites on sheep and goats. Has a detaching effect on ticks. OXPECKER COMPATIBLE.



Spray: 1 L / 1 000 L water
Boost with 100 ml / 200 head after 400 head sprayed
Plunge (total replenishment): 1 L / 5 000 L water
Plunge (lime stabilised): 1 L / 1 000 L water



Plunge (fresh fill):
1 L / 750 L water



Plunge (fresh fill):
1 L / 750 L water

Withdrawal period:

Meat: 7 Days

Milk: None

Registration holder: ECO Animal Health Southern-Africa (Pty) Ltd Co. Reg. No.1992/000835/07



Packaging available

500 ml, 1 L, 5 L, 10 L