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Parasite Control Leaflet Series,
Vol. 8, Ver.1, July 2013



Redwater

- the facts



Rough grazing is an ideal habitat for ticks and cattle should be monitored closely in the high risk periods for Redwater disease

What is redwater?

Redwater can be a very severe life-threatening disease of cattle and must be treated promptly. It is caused by *Babesia divergens* (referred to as the 'redwater parasite' in this leaflet), a single-celled parasite. The disease is transmitted by ticks (*Ixodes ricinus*, the common tick seen on Irish livestock). Once ticks become infected they can pass the infection from generation to generation of ticks. Farmers should aim to prevent animals from being bitten by ticks by keeping pastures short and well managed.

How will I know if an animal has redwater?

In the early stages of the disease, signs may be limited; however animals can die quite quickly and frequent observation is needed during high risk periods. Contacting your own veterinary practitioner immediately you suspect redwater is recommended.

Early stage signs include:

- animals staying away from the herd on their own
- reduced appetite
- hollow left flank
- high temperature
- frothy urine with a red-brownish colour (this will be nearly black in severe cases)
- diarrhoea (often "pipestem diarrhoea" which is passed in a thin jet)

Later (and often terminal) signs include:

- weakness / animal staggering and unable to stand
- changes in the colour of skin and mucous membranes (the gums, under the eyelids) from pink to abnormally pale (anaemic) or yellow tinge (jaundice)
- sub-normal temperature
- normal urine colour
- constipation
- death



Good pasture management practices should aim to prevent undergrazing & overgrowth

Tick life cycle

All feeding stages of infected ticks can transmit Babesia to cattle. The tick has a three-year life cycle with four stages - egg, larva, nymph and adult. When any of the latter three stages bites a bovine animal, it is capable of transmitting the redwater parasite. The tick eggs develop into larvae which have to bite an animal and have a meal of blood before they can develop to the next stage. Similarly, the nymphs need a blood meal before developing into adults and the adults need a blood meal before they lay eggs. Each stage can take approximately a year to develop. The adult female ticks normally feed on cattle (or alternate hosts such as sheep and deer), then they fall off, lay eggs and die.

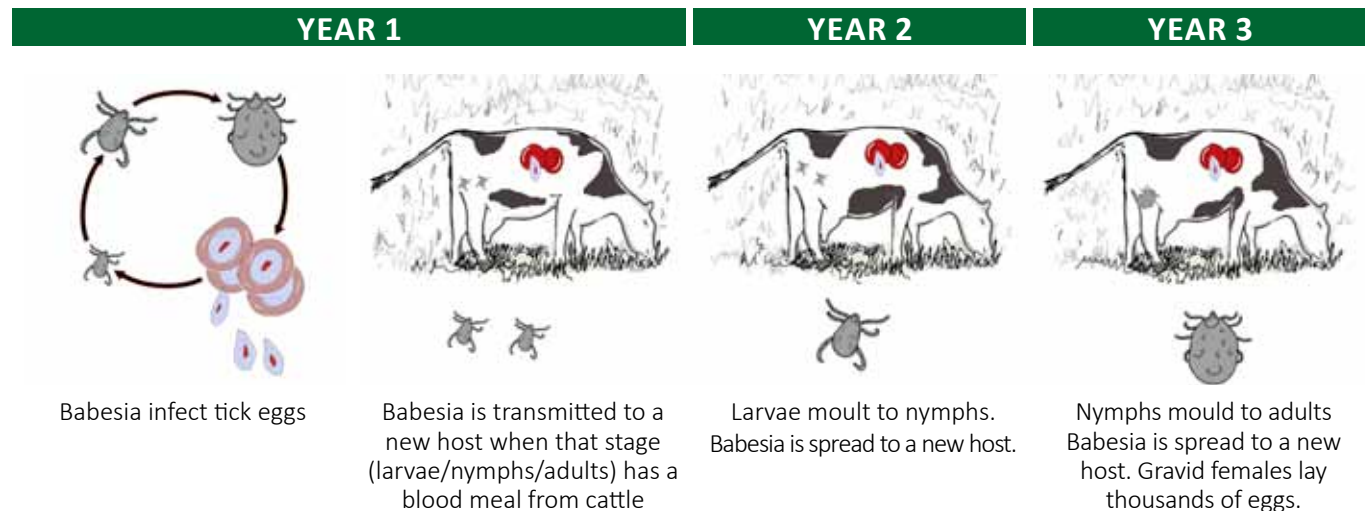


Figure 1: Any infected tick stage is capable of transmitting redwater infection when they feed on cattle

When & where does redwater occur?

Discuss the redwater history of the area with the local veterinary practitioner or other farmers if new to an area. There is an incubation period of approximately three weeks (from the time an animal is bitten by infected ticks until signs become apparent).

Three factors combine to determine when and where redwater will occur in cattle in Ireland.

1. Tick habitat

Apart from the 3-9 days (depending on the stage) each year that the ticks spend attached to an animal, they live in the moist, sheltered microclimate at the base of the pasture sward. Densely vegetated or undergrazed rough pasture provides an ideal tick habitat, and the risk of redwater is greatest in these areas. Well managed and closely grazed swards will hold much smaller numbers of ticks, and animals grazing in these areas are at a lower risk from redwater but can still become infected, particularly from field margins and headlands in recently improved pastures. Infection can pass from generation to generation of ticks using other animals such as deer, sheep or other wild mammals or birds as hosts. This can allow the survival and persistence of infected ticks even if there are no cattle in the area.



Closely monitor all cattle especially older cattle in high risk periods

2. Weather

When the tick leaves the shelter of the vegetation to seek out a host on which to feed, it is very vulnerable to adverse environmental conditions - particularly to drying out. Therefore, the ticks tend to avoid seeking hosts during hot dry periods. Traditionally, the highest risk periods occur in late spring/early summer (April, May) and in autumn (August-October). However, cases of redwater may occur throughout the year if climatic conditions are suitable.



Observing stock carefully and frequently in high risk periods is essential

3. Immunity/Resistance to infection

One of the unusual features of redwater is that calves exhibit some natural resistance compared to adult cattle. Cattle under approximately six months tend not to develop clinical disease.

This explains why many closed herds in the most heavily infested areas of the country rarely get clinical redwater.

However, if animals older than six to nine months are introduced from a non-endemic area into the endemic area, they will be highly susceptible to infection and serious illness.



Calves exhibit some natural resistance compared to adult cattle

Do all ticks carry the redwater parasite?

No, but it is impossible to tell which do, and which don't.

Other infectious agents may be injected into the animal when the animal is bitten by the ticks, such as the pathogen which causes tick-borne fever.



Ticks carry the redwater parasite

Technical box

In an infected tick, the redwater parasite develops and spreads throughout the tick's organs, eventually invading the salivary glands or eggs. When the infected tick bites cattle, the parasites are injected into the bloodstream where they enter red blood cells. Here, the redwater parasite rapidly divides in susceptible cattle - eventually rupturing (destroying) the red blood cell, which releases the parasites which then will infect further red blood cells. Each time this cycle is repeated, more and more red blood cells are ruptured.

This has two effects:

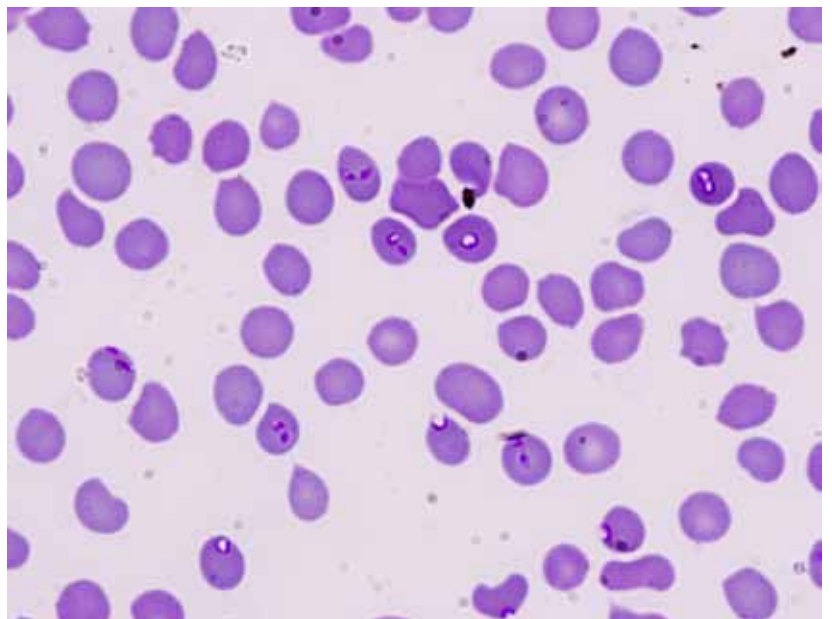
1. The animal loses red blood cells and becomes anaemic, and the ability of its blood to carry oxygen is therefore reduced.
2. The red pigment (haemoglobin) is released into the bloodstream when red blood cells rupture and it is excreted by the kidneys where it causes toxic damage. Haemoglobin gives the urine its characteristic dark colour (which can vary from black through brown to red).

While the colour of the urine may lighten, and even clear completely in the later stages of the infection, this does not necessarily mean the animal has recovered - as it is also seen when animals move into the final phase of the disease.

If the anaemia is severe, the heart will beat harder and faster to try to make up for the lost blood cells. The blood is very thin, the heart sounds much louder than normal, and can be heard when you get within a few feet of the animal.

How will I spot redwater in the early stages?

The incubation period (the time from when the animal is bitten to showing signs of disease) can be up to three weeks. Careful and frequent observation is the best way to detect cases in the early stages of disease. In particular, regular checking on recently introduced cattle at pasture is essential in order to detect cases as soon as possible. Subtle changes to normal cattle behaviours such as eating, chewing the cud and resting are often the first sign that something is wrong. Always pay attention to the one animal that does not stand up as you approach the cattle, or the animal that is on its own, or standing in shelter when the others are out grazing. Always check urine and faeces whenever possible.



Babesia as seen under microscope (Photo courtesy of RVL, DAFM)

What should I do if I think an animal has redwater?

Call your own veterinary practitioner immediately, stating your suspicion. Red urine can occur in conditions other than redwater and early diagnosis and prompt veterinary treatment are key to survival.

Veterinary treatment may include:

- injection with Imidiocarb Dipropionate which is a drug which kills the redwater parasite **(withdrawal period of 213 days and 21 days for meat and milk, respectively)**.
- a blood transfusion to replace lost red blood cells.
- other supportive therapies as required.

Even with prompt treatment, this is a serious disease with a significant mortality rate. Provision of shelter and care are good practice.

Animals without previous exposure to the redwater parasite, cows (particularly in advanced pregnancy) and poorly nourished animals tend to be more severely affected.

Even when animals survive, pregnant heifers / cows may abort.

It can be life threatening to agitate or move an animal in the advanced stage of the disease, as it may die of heart failure if stressed. Severely anaemic animals may behave unpredictably or become dangerously aggressive because of the effect on brain function of lowered blood oxygen.

How can I prevent redwater?

Aim to prevent animals from being bitten by ticks.

- Follow good pasture management practices to prevent undergrazing & overgrowth.
- Clear scrub (furze, ferns and rushes) from grazing land.
- Keep susceptible cattle out of tick-infested areas especially in the peaks of tick activity in spring and autumn.
- Take specific preventive measures (see below) when susceptible animals are grazing in tick-infested areas.
- If you have to graze areas known to be infested with ticks, try to use home-bred stock that have been exposed to these areas as young calves in their first six months of life.
- Try to ensure that any bought-in animals are younger than six months old, and exposed to ticks and redwater before their innate immunity wears off. Alternatively, buy in animals which are known to have grazed tick-infested areas.
- Rushy ground, gorse, scrub and bracken provide ideal habitats for ticks. Good grassland improvement practices, including reclamation and reseeding will help reduce the tick habitat areas that your cattle can be exposed to and this will reduce redwater. But be aware that ticks can persist in the margins and headlands of reclaimed fields and sporadic cases may still occur.



Blood transfusions replace lost blood cells

Early identification of affected animals is vital to prevent high mortality

Technical box

Specific preventive measures:

Liaise with your own veterinary practitioner about the best time to use preventive products and which ones are most suitable for your farm. Tick control is difficult and even after treatment animals should be monitored closely in high risk periods.

- Topical treatments: Some products are available that control ticks. When the effect of these wears off, the animal's susceptibility to being bitten and infected is the same as the untreated animals.

Topical treatments licensed for use to control ticks in cattle

Flumethrin*
Amitraz*

*active ingredients

- Injectable products: Injecting the animals with imidocarb dipropionate at twice the treatment dose which will limit parasite multiplication for approximately four weeks. Ideally, cattle should be allowed to become infected while being fully protected by the drug, so that they can develop a natural immunity as the drug is slowly metabolised and eliminated from the animal. It is important to note that imidocarb dipropionate used preventatively is not a vaccine; it will only help if infected ticks are active when it is administered and for a four week period thereafter. Note: care should be taken to observe the protracted withdrawal period **(213 day withdrawal period in meat and 21 days for milk)** associated with imidocarb dipropionate.

Both of these methods need to be judiciously timed to ensure coverage through the tick season. Injecting imidocarb dipropionate has the advantage that those animals that get bitten while 'covered' by the drug will normally become immune to the disease. Unfortunately there is no way to tell which of the animals have become immune and which ones still remain susceptible.

Despite taking all of the above measures, cases of redwater may nevertheless occur (although generally fewer and milder). The preventive measures outlined above are no substitute for close supervision and expert stockmanship. Cattle at pasture need to be checked carefully at least daily, and twice daily in the peak tick seasons.



Keep pasture short and well managed to minimise redwater disease risks

Rented ground for the first time - new ground may pose a risk to your cattle

Early identification of affected animals is vital to prevent high mortality

Call your veterinary practitioner if you suspect that redwater is a problem

TECHNICAL WORKING GROUP

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Fionnuala Malone, Animal Health Ireland.

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