Parasite Control leaflet series

AHI
Animal Health Ireland.ie

ANIMAL HEALTH IRELAND

Contributing to a profitable and sustainable farming and agri-food sector through improved animal health

Redwater - the facts

Parasite Control Leaflet Series, Vol. 9, Ver.1, November 2017

PARASITE CONTROL PROGRAMME

Parasite Control
Animal Health Ireland.ie

Animal Health Ireland, 4-5 The Archways, Carrick-on-Shannon, Co. Leitrim, N41 WN27

AHI gratefully acknowledges the financial and other contributions of our stakeholders.

PARASITE CONTROL PROGRAMME

Parasite Control
Animal Health Ireland.ie

Animal Health Ireland, 4-5 The Archways, Carrick-on-Shannon, Co. Leitrim, N41 WN27

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 protozoan 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. It is recommended that you contact your own veterinary practitioner immediately if you suspect a case of redwater.

Early stage signs include:

- animals staying away from the rest of the group/herd
- 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 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 and 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. Transovarial transmission can occur meaning once established in the tick host, the redwater parasite can apparently persist through the larval and nymph stages even if the intervening tick stages feed on uninfected blood.

A bovine animal not previously exposed to the redwater parasite may become infected if bitten by either a larva, nymph or adult tick that is carrying the infection.

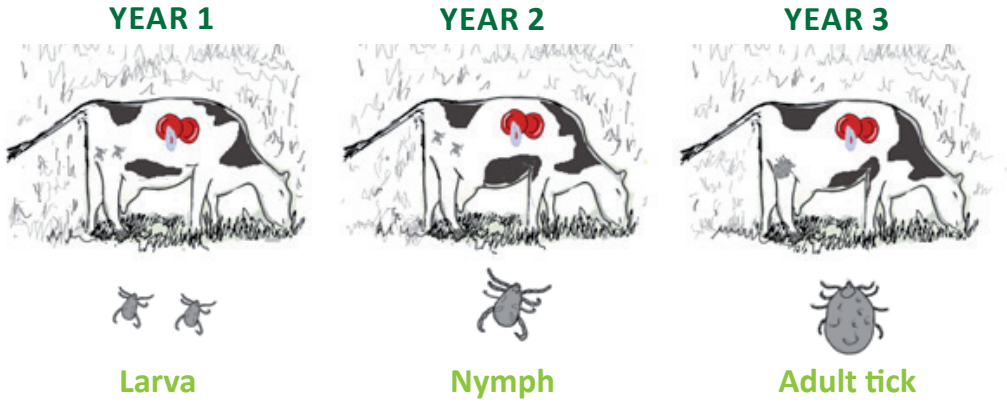


Figure 1. There are four stages in the life cycle of the tick *Ixodes ricinus:* egg, larva, nymph and adult. Each stage (other than the egg) has to have a blood meal before it develops to the next stage or before the adult can lay eggs.

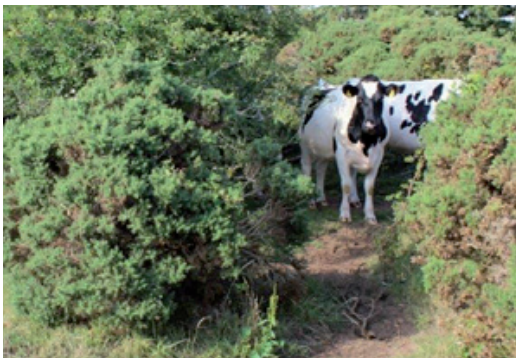
Engorged adult tick following a blood meal from bovine animal

When & where does redwater occur?

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

1 Tick habitat

Apart from the 3-9 days each year (depending on the stage) that the ticks spend attached to an animal, they live at the base of the pasture sward where conditions are moist and sheltered. 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 of 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, 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

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 of age tend not to develop clinical disease.

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

However, if animals older than six to nine months of age 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

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

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 may 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 and 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 cells, 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:

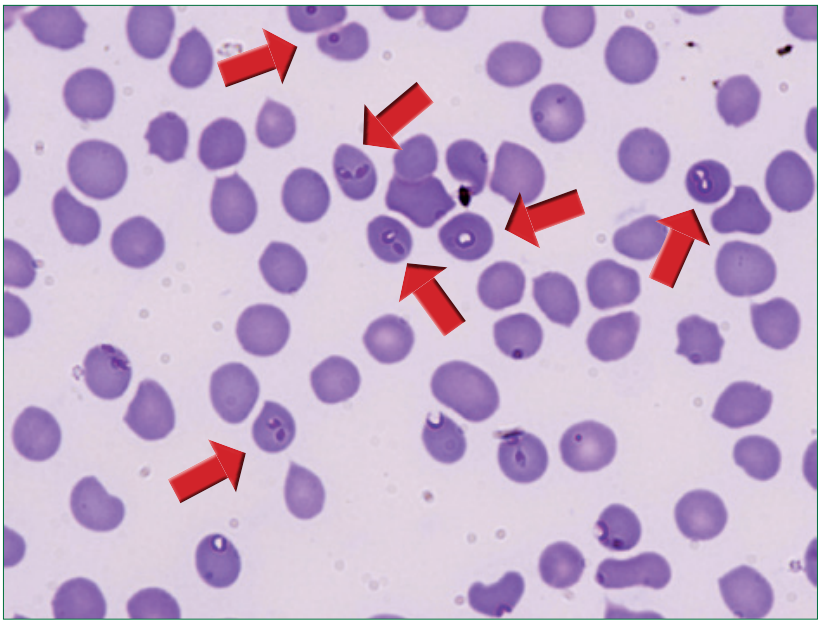
1. The animal loses red blood cells and becomes anaemic, and the ability of its blood to carry oxygen is therefore reduced.
2. The red pigment (haemoglobin) is released into the bloodstream when red blood cells rupture and it is excreted by the kidneys. Haemoglobin gives the urine its characteristic 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 enter 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 red 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 bovine 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 of recently introduced cattle at pasture is essential in order to detect cases as soon as possible. Subtle changes to normal cattle behaviour such as eating, chewing the cud and resting are often the first signs that something is wrong. Always pay attention to the one animal that does not stand up as you approach a group of cattle, or the animal that is on its own, or standing in shelter when the others are out grazing. Always check their 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:

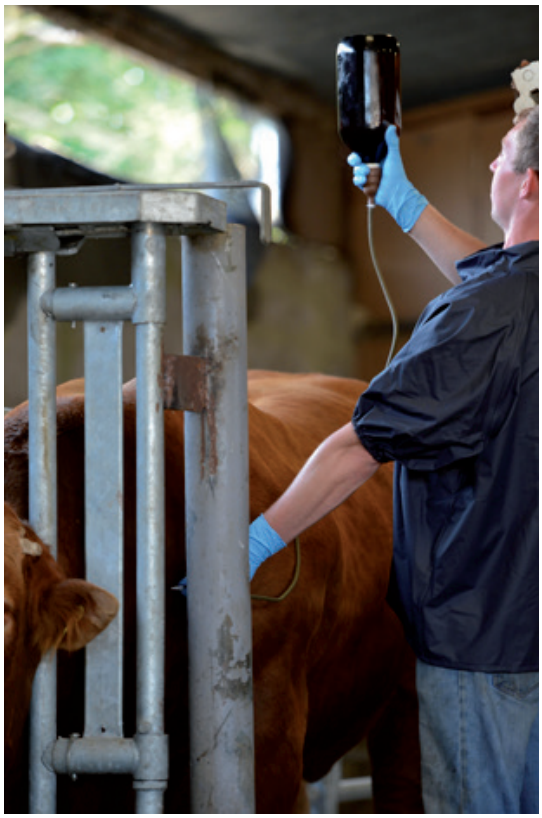
- injection with imidocarb dipropionate which is a drug which kills the redwater parasite **(withdrawal period of 213 days and 21 days for meat and milk)**.
- a blood transfusion to replace lost red blood cells.
- other supportive therapies as required.

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

Animals older than four to nine months and 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.**



Blood transfusions replace lost blood cells

How can I prevent redwater?

Early identification of affected animals is vital to prevent high mortality

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 of age, 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 exposure of cattle to ticks and this will reduce disease due to redwater. But be aware that ticks can persist in the margins and headlands of reclaimed fields and sporadic cases may still occur.

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 treaments: 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.
- Injectable products: Injecting the animals with imidocarb dipropionate at twice the treatment dose 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 help only 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.

Topical treatments licensed for use to control ticks in cattle
Flumethrin*
Amitraz*

**active ingredients*

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

When renting ground, consider the danger that your cattle may get redwater on that land

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

James O'Shaughnessy, (Chairperson) - DAFM, Veterinary Laboratory Services, **Charles Chavasse**- Zoetis, **Bosco Cowley**- MSD Animal Health, **Martin Danaher** - Teagasc Food Research Centre Ashtown, **John Gilmore** - Veterinary Practitioner, **Barbara Good** - Teagasc, Athenry, **Fintan Graham** - Veterinary Practitioner, **Ian Hogan** - DAFM, Veterinary Laboratory Services, **Mark McGee** - Teagasc, Grange, **Jennifer McClure** - Irish Cattle Breeding Federation, **Grace Mulcahy**- UCD School of Veterinary Medicine, **Maresa Sheehan** - DAFM, Veterinary Laboratory Services, **Donal Toolan** - DAFM Regional Veterinary Laboratory, Kilkenny, (Retired), **Theo de Waal** - UCD School of Veterinary Medicine

TECHNICAL WORKING GROUP RAPPORTEUR

Rebecca Carroll - Animal Health Ireland

Parasite Control Leaflet Series, Vol. 9, Ver.1, November 2017

AHI Animal Health Ireland.ie

4-5 The Archways, Carrick-on-Shannon, Co Leitrim N41 WN27.
Phone 071 9671928
Email nmorgan@animalhealthireland.ie
Web www.animalhealthireland.ie