Knowledge-driven dairy solutions.

Dairy Parasite Management

FARM HEALTH FIRST By chanelle PHARMA

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THE THREE ‘PINCH-POINTS’

Parasites can affect animal health and performance at any time on any given farm, or in any given year.

However, there are three key points in the dairy production cycle where a good strategy on parasites is vitally important.

This is either because our animal becomes vulnerable, or because we have a window to take smart, preventative action that'll pay off later in the cycle.

The R1/First Season Dairy Calf

These animals are probably the most vulnerable from a parasite point of view across all types of cattle production. The dairy calf typically encounters significant burdens of parasites like coccdia or worm larvae, before it has had a chance to develop full natural immunity. Clinical infections cause animal welfare and farm labour issues. However, subclinical performance reductions - common with coccidiosis - can cause decreases in performance that may not be readily obvious. These can be very costly, particularly in a block calving system where heifer weight gain is a crucial fertility variable.

Mid-Lactation Larval Challenge

Irish farmers are at the forefront of pasture-based, sustainable dairy systems and revered the world over for the performance their animals and farms achieve. It's worth remembering though, that as metrics like stocking rates and 'grazings per paddock' rise, so too will the unseen parasite burden underfoot. Our temperate climate is ideal for parasites to thrive in. As the season progresses and larval levels build with each grazing, we begin to see symptoms such as coughing cows, pressure on body condition or reduced yields.

The Dry Period

The dry period is less of a risk point and more of an opportunity for Irish cows and farmers. Animals will be indoors, where pasture parasites can't be picked up, and can be treated with active ingredients not permitted during lactation. However, there are still milk withdrawals which must be taken into account on the majority of products, so timing during the dry period is important too. The dry period is a chance for cows to get their 'annual service' much like a motor car, and set up for the year ahead in full health.

PARASITES IN FOCUS

Coccidiosis

NOT JUST A BLACK, BLOODY SCOUR

Coccidiosis is a disease caused by tiny single-celled organisms that disrupt gut function, causing diarrhoea and ill thrift. These are known as coccidia and belong to the protozoa family. Microscopic coccidia oocysts (eggs) live in large numbers in the animal's environment and are extremely resilient. In the right conditions (heat and moisture) they become infective (switch on). They are consumed via the mouth and eventually arrive in the intestine. Here they penetrate cells in the intestinal lining. These play a vital role in the absorption of food and water from the intestine into the animal's blood stream. Inside these cells the coccidia multiply rapidly, eventually causing the cells to burst. Damaged cellular material contributes to the bloody scour symptom commonly associated with coccidiosis. Time from ingestion of oocysts to potential symptoms in cattle and sheep will be 18-24 days.

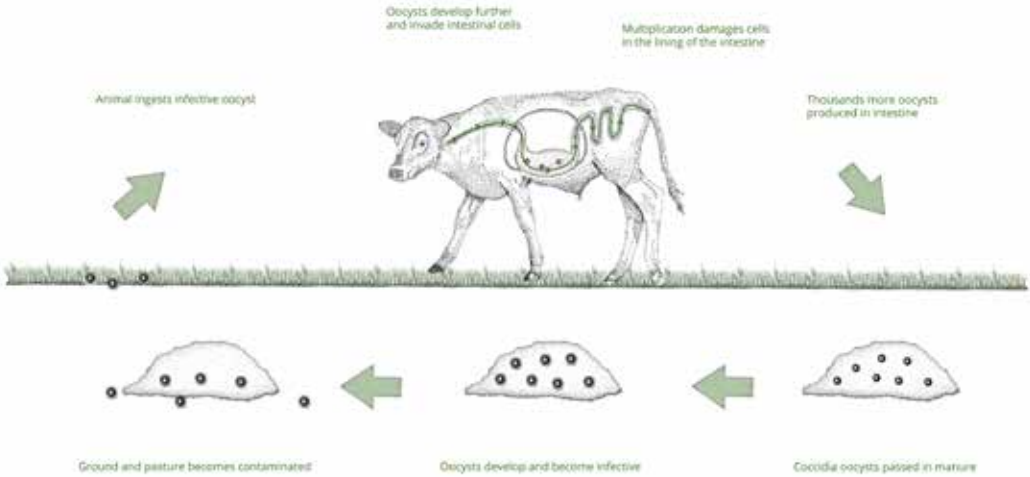
Intestine of calf with severe coccidiosis

Older animals develop an immunity to coccidiosis and can harbour small burdens without issue. Younger animals are more vulnerable, and their immunity takes time to build. The problem is that on commercial farms it can be difficult to keep coccidia levels low (maximise hygiene) and young animals commonly experience significant burdens of the parasite. If the burden is high enough, then we can have clinical coccidiosis.

However, from a whole herd or flock point of view, cases of clinical coccidiosis are generally confined to a small percentage of animals. From a review of the recent research, only 4% of infected animals will display clinical symptoms on average[1].

The other symptomless animals' immune systems will prevent the parasite from overwhelming them. But this comes at a cost. The immune system is powered by dietary energy and any immune response uses energy that the animal may have used for things like maintenance or growth. Although just 4% of infected animals display coccidiosis symptoms, across full animal groups a 'silent' 19% reduction in growth rates has been demonstrated[1]. Stress has a significant role to play in the onset of clinical coccidiosis symptoms as it can act to weaken an animal's immune system. Common stressors include transport, weaning, dehorning, dietary change or inclement weather.

Coccidiosis lifecycle:



Although just **4%** of infected animals display coccidiosis symptoms, across full animal groups a 'silent' **19%** reduction in growth rates has been demonstrated.

Gastrointestinal Worms

A REAL DANGER FOR YOUNG CALVES

An infection of gastrointestinal (GI) worms has the potential for a 30% performance (growth rate/production) reduction in cattle, particularly in young animals such as first-season calves. Common signs of clinical disease include the classic scouring, inappetence and a loss in condition. However, the disease can also affect mature animals in a sub-clinical nature – in adult dairy cows a significant GI worm burden can reduce milk production by 1-2kg daily. This is generally due to a 'cost of immunity' as energy is diverted away from production and towards the necessary immune response which prevents clinical symptoms from manifesting.

Adult worms lay eggs within the animal which are dispersed onto pasture via dung. Eggs hatch into L1 larvae in the dung, which then molt into L2 and infective L3 larvae. Infective L3 larvae can survive on pasture for over 12 months and the temperature conditions of the UK and Ireland are ideal for facilitating this. Once ingested, the L3 develops into L4 within the glands and a parasite will reach adulthood (eggs detectable in faeces) within three weeks.

Two species of GI worm are of commercial importance to cattle farmers in Ireland and the UK – *Ostertagia o.,* which acts in the abomasum (stomach) and *Cooperia o.,* which affects the small intestine.

Ostertagia

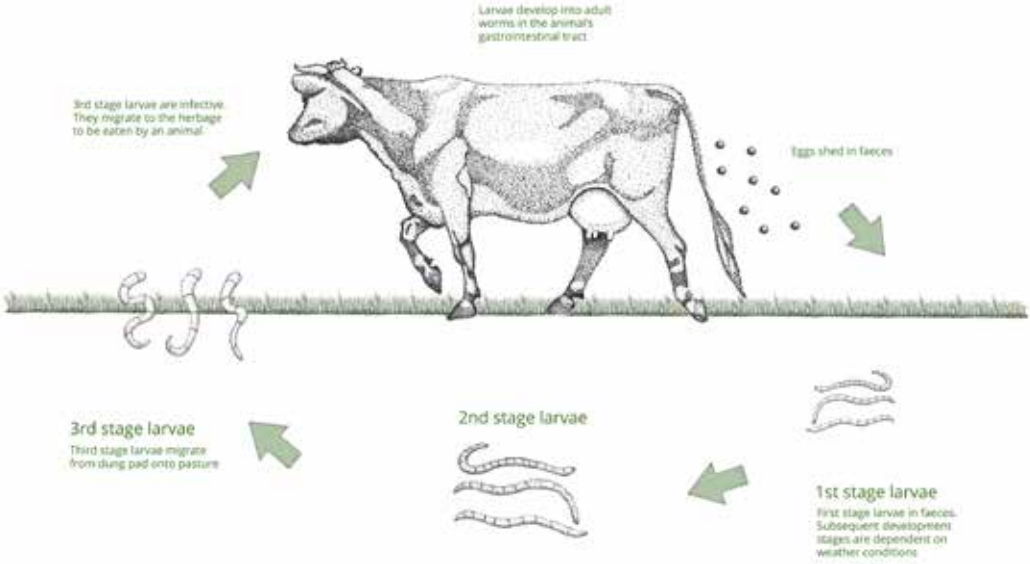
Ostertagiosis affects the lining of the abomasum (stomach) and causes a thickening of the lining and associated glands. A heavy infestation causes a reduction in the acidity of the stomach, leads to poorer protein ingestion and sees the proliferation of unwanted bacteria and appetite-suppressing compounds. Visually, scour caused by *Ostertagia* will have a green tinge and a heavily infected animal can lose 20% of bodyweight within 10 days. Natural immunity to *Ostertagia* may take up to two full grazing seasons to develop and older animals are still at risk if burdens are high enough. In terms of diagnostics around GI worms in cattle, common methods include faecal egg analysis, milk tank antibody tests and weight gain monitoring.

In recent years, progress has been made around using milk antibody tests as part of a control strategy. Milk ODR (observed density ratio) for *Ostertagia* antibodies has demonstrated use as a metric for determining whether anthelmintic treatment was required/would be advantageous. Research has shown that once ODR surpasses 0.5, potential yield is reduced.

Cooperia

Cooperia is less obvious than *Ostertagia* in terms the prevalence and severity of symptoms during an infection. Its action involves damage to the lining of the intestine, reducing the animal's capacity to digest and absorb nutrients. Animals will generally become naturally immune to *Cooperia* after one full grazing season.

Gastrointestinal worms lifecycle:



- An infestation of GI worms has the potential for a **30%** performance (growth rate/production) reduction in cattle.
- However, the disease can also affect mature animals in a sub-clinical nature – in adult dairy cows a significant GI worm burden can reduce milk production by **1-2kg** daily.

Lungworm

COUGHING COWS BECOMING MORE COMMON

Research published earlier this decade puts the cost of lungworm in a dairy herd between €159 and €167 per cow[2]. The symptoms of lungworm are commonly termed 'husk' or 'hoose', and include:

- **Coughing**
- **Laboured Breathing**
- **Yield Reduction**
- **Condition Loss**
- **Pneumonia**
- **Death In Dairy Calves**

The animals most at risk of lungworm infection are first season dairy calves grazing permanent or semi-permanent pastures and we would expect to see infection from two months post-turnout. However, growing stocking pressure coupled with Irelands unpredictable weather extremes have led to an increased number of mature animals presenting with hoose. Unlike gastrointestinal worm immunity, elements of an animal's natural immunity to lungworm will wane without regular exposure to small burdens. We now frequently see dropping milk yields and mature animals exhibiting hoose from two months post-turnout as a result of larval irritation of the respiratory tract. These larvae may not reach maturity, as this component of our animal's immunity remains, but they are still detrimental.

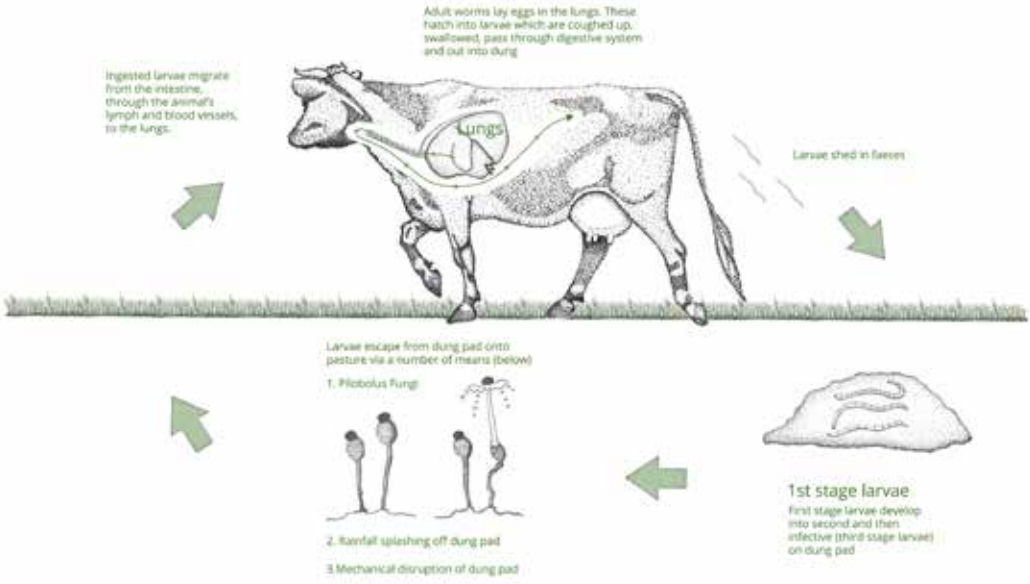
Lungworm in a bovine respiratory tract

Mature lungworm live in the bronchi (pipes that connect the windpipe to the lungs) and lay eggs which hatch into larvae. These are coughed up and swallowed. They then work their way through the digestive system and out onto pasture via the animal's dung. In order to find its way back into our animal, the larvae must get from the dung pat out onto pasture. Rainfall is vital in this part of the process. Once on pasture, the larvae are consumed by our

animal as they graze. On reaching the intestine, they migrate into the blood stream to find their way into the lungs. Here they develop further into mature lungworm and begin to lay eggs. Large numbers of mature lungworm cause inflammation and reduce the animal's respiratory capacity, leading to hoose symptoms.

In terms of diagnostics around lungworm, ELISA tests can be used. However, lungworm antibodies will remain in the system for up to seven months post infections and so these can give a false positive reading. Faecal analysis - Baermann Test - can also be used to test for lungworm.

Lungworm lifecycle:



- The animals most at risk of lungworm infection are first season dairy calves.
- Mature cows can also suffer from lungworm infection as their natural immunity fluctuates without constant exposure to burdens.
- Research published earlier this decade puts the cost of lungworm in a dairy herd between **€159 and €167 per cow**.

Liver Fluke

NOT JUST A PROBLEM FOR WET LAND

Research published in 2016 suggested that 82% of Irish, dairy herds have been exposed to liver fluke[3]. Based on a 2015 study, a significant outbreak could cost the average, 90-cow Irish dairy herd in the region of €20,000[4].

The full fluke life cycle takes 18-20 weeks. When an animal ingests an infective fluke larva from pasture, it works its way through digestive system and eventually arrives in the small intestine. Here it develops into an immature liver fluke, before burrowing through the lining of the gut and continuing towards the liver. The liver plays a vital role for our animal. It is responsible for the removal of harmful toxins from the system, the production of glucose – the body's fuel source – and the synthesis of important proteins and antibodies which are key components of the immune system.

Young fluke (early immature/immature) tunnelling through our animal's liver disrupt these mechanisms. Once a fluke reaches the bile duct it matures and begins to lay eggs. Here it feeds on blood from the lining of the duct. While a large infestation of mature fluke can lead to anaemia in the animal and have a negative effect on fat digestion, the main losses associated with liver fluke come about during the immature stage of the parasite's life cycle (first 6-8 weeks) when it is boring tunnels through our animal's liver.

Mud snail

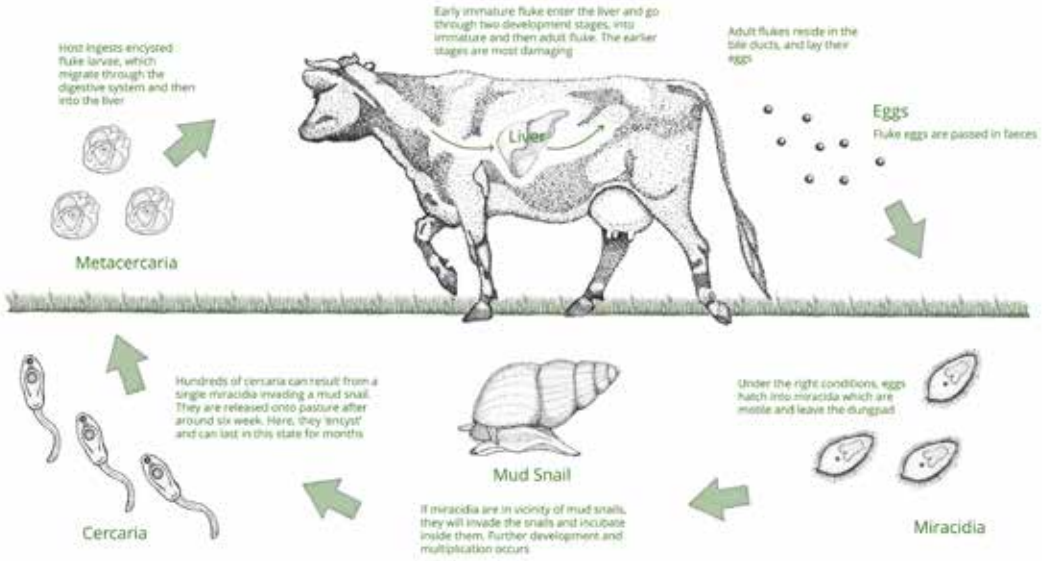
A single mature fluke in an infected animal has the capacity to lay up to 20,000 eggs per day for months on end. When it hits pasture via dung, a fluke egg will hatch into a young larva with the right levels of moisture and heat. This larva has some level of mobility and goes in search of the intermediate host (mud/water snail) which it needs to complete its life cycle. These peppercorn-sized snails are most active where there is heat and moisture and will hibernate in cool, dry weather.

Inside the snail, the larva multiplies and after 4-6 weeks upwards of 600 infective larvae will be released onto pasture. These larvae are what leads to a liver fluke infection.

There is a misconception that all dry farms are 'immune' from liver fluke infection given the need for moisture. However, a single wet area can act as a harbour for fluke larvae. Boggy conditions common on heavy farms are ideal, but other favourable scenarios could include depressions in fields, muddy gaps or leaking water troughs.

Fluke risk will be highest in a year where infected animals were grazing pastures during a wet summer (May to July). Milk bulk tank serum and ELISA analysis can be used to test for the presence of fluke antibodies. Faecal egg counts will only detect the presence of mature fluke (egg layers) in an animal.

Liver fluke lifecycle:



- Research published in 2016 suggested than 82% of Irish, dairy herds have been exposed to liver fluke.
- A single wet area can act as a harbour for fluke larvae.
- Younger fluke are more damaging that mature fluke in our animal's liver.
- A single mature fluke in an infected animal has the capacity to lay up to **20,000 eggs** per day.

The R1/First-Season Dairy Calf

COCCIDIOSIS

When: Farm specific, from four weeks of age to mid/late season.

The solutions:

1 - DYCOXAN

Timing: One week in advance of symptoms (based on farm history), across whole group.

Dose rate: 4ml/10kg

Admin route: Oral

Active ingredient: Diclazuril

Pack sizes: 1l, 2.5l

Doses per pack: 65kg calf: 1L = 38

OR

2 - CHANOX

Timing: One week in advance of symptoms (based on farm history), across whole group.

Dose rate: 3ml/10kg

Admin route: Oral

Active ingredient: Toltrazuril

Pack sizes: 250ml, 1l

Doses per pack: 65kg calf: 1L = 51

Comment: Maximising hygiene (in rearing shed) or moving animals to clean pasture post-dosing will help to reduce the need for subsequent treatment. Monitor animal performance and symptoms from three weeks post treatment.

GASTROINTESTINAL WORMS AND LUNGWORM

When: Animals can pick up overwintered larvae straightaway post-turnout and these will multiply through the animal, contaminating pastures further for later in the season.

The solutions:

1 - ANIMEC INJECTION

Timing: 3, 8 and 13 weeks post turnout

Dose rate: 1ml/50kg

Admin route: Subcutaneous injection

Active ingredient: Ivermectin

Pack sizes: 250ml, 500ml

Doses per pack: 175kg calf: 250ml = 71

OR

2 - ANIMEC POUR ON

Timing: 3, 8 and 13 weeks post turnout

Dose rate: 1ml/10kg

Admin route: Topical Pour on

Active ingredient: Ivermectin

Pack sizes: 1l, 2.5l, 5l

Doses per pack: 175kg calf: 1L = 57

Comment: These treatment timings are designed to allow for stimulation of the animal's own immunity, provide protection and prevent pasture contamination. It's very important that they're tightly adhered to, that animals remain on the same grazing area for the full season and that new animals are not introduced to groups once treatment has begun.

The Mid-Lactation Cow

LUNGWORM

When: Animals can pick up overwintered larvae straightaway post-turnout and these will multiply through the animal, contaminating pastures. Levels can be high enough to affect our animals' routines and performance from around two months post-turnout. However, weather and rotation number can affect timing too.

The solution:

1 - EPROMEC POUR ON

Timing: When a portion of the herd is noticeably coughing post-exercise/when yields are affected/when antibodies (e.g. *Ostertagia* ODR) are detected at significant levels in bulk milk readings.

Dose Rate: 10ml/100kg

Admin Route: Topical Pour on

Active Ingredient: Eprinomectin

Milk Withdrawal: Zero days

Pack Sizes: 1l, 3l, 5l

Doses Per Pack: 650kg cow: 5L = 76

Comment: Epromec provides 28 days of persistency against reinfection from lungworm. Note that the action of clear wormers like Epromec may lead to increased levels of coughing post-treatment when a lot of dead worm material causes an allergic reaction in the lungs. This is why it's important not to delay intervention when infection is expected.

The Dry Cow

When: Use treatments during the dry period as the cows 'annual service' so that health is optimised for the following lactation. If concurrent with housing time, remember to consider external parasites (e.g. lice and mites) also.

The risks: Gastrointestinal worms, lungworm, liver fluke, external parasites (lice and mites).

The solutions:

LOW LIVER FLUKE RISK FARM

1 - ALBEX 10%

Timing: At dry off/housing

Dose Rate: 10ml/100kg

Admin Route: Oral

Active Ingredient: Albendazole

Milk Withdrawal: 60 hours

Pack Sizes: 1l, 2.5l, 5l

Doses Per Pack: 650kg cow: 5L = 76

Comment: Albex 10% covers lungworm, gastrointestinal worms and liver fluke. Note it is only effective against mature liver fluke (>10 weeks old) and if a burden of younger, more damaging immature fluke is expected an alternative product should be used. A topical treatment for external parasites should be considered here too, for example a synthetic pyrethroid such as deltamethrin.

OR

2 - ANIMEC POUR ON

Timing: At dry off/housing

Dose rate: 10ml/100kg

Admin route: Topical Pour On

Active ingredient: Ivermectin

Milk withdrawal: 60 days

Pack sizes: 1l, 2.5l, 5l

Doses Per Pack: 650kg cow: 5L = 76

AND

RUMENIL

Timing: At dry off/housing or in weeks pre-/at calving

Dose rate: 105ml (above 350kg)

Admin route: Oral

Active ingredient: Oxyclozanide

Milk withdrawal: 108 hours

Pack sizes: 5l

Doses per pack: 650kg cow: 5L = 47

Comment: The pour on treatment will cover the important internal worms as well as external parasites. Rumenil contains oxyclozanide, which is effective against mature liver fluke, has no known resistance and the dose can be delayed until later in the dry period given the short withdrawal period. Consult a vet before using Rumenil in late-pregnancy.

HIGH LIVER FLUKE RISK FARM
1 - ANIMEC POUR ON

Timing: At dry off/housing.

Dose Rate: 10ml/100kg

Admin Route: Topical Pour On

Active Ingredient: Ivermectin

Milk Withdrawal: 60 days

Pack Sizes: 1l, 2.5l, 5l

Doses per pack: 650kg cow: 5L = 76

AND .....

TRIBEX 10%

Timing: 7-10 days post-housing

Dose rate: 12ml/100kg

Admin route: Oral

Active ingredient: Triclabendazole

Milk withdrawal: 41 days + 84 hours post-calving

Pack sizes: 800ml, 2.2l, 5l

Doses per pack: 650kg cow: 5L = 64

Comment: The pour on will cover the important internal worms as well as external parasites. Delaying the triclabendazole dose allows for any fluke larvae ingested at or just before housing to be covered by the treatment.

REFERENCES: 1. Lenehan, 2019. Literature Review. www.cocci.news/research. 2. Holzhauer, M., et al. 494, 2011, Veterinary Record, Vol. 169. 3. Selemetas, Nikolaos and de Waal, Theo. 3-4, 2015, Veterinary Parasitology, Vol. 209, pp. 242-253. 4. Cooper, Kevin M., et al. 1, 2015, Trends in Food Science & Technology, Vol. 44, pp. 21-35.

Legal category of all products: IE: LM

Dycoxan® Oral Suspension for sheep and cattle contains 2.5 mg/ml diclazuril. VPA No: VPA 10987/122/001. Chanox Multi® oral suspension for sheep and cattle contains 50 mg/ml toltrazuril. VPA 10987/132/001. Animec Solution for Injection for pigs and cattle contains 10mg/ml ivermectin. VPA 10987/147/001. Animec Pour-on Solution for Cattle contains 5 mg/ml ivermectin. VPA10987/152/001. Epromec Pour-on Solution for beef and dairy cattle contains 5 mg/ml eprinomectin. VPA 10987/107/001. Albex 10 % Oral Suspension contains 100mg/ml albendazole. VPA 10987/142/002. Rumenil oral suspension for cattle contains 34 mg/ml oxyclozanide. VPA 10987/113/001. Tribex 10 % Oral Suspension for Cattle contains 100mg/ml triclabendazole. VPA10987/146/002.

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