Disease trend report: April 2014

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This report was prepared by Dr Danie Odendaal of Veterinarian Network in support of the Disease Monitoring and Extension System for the South African dairy industry.

All information contained in this report is based on informal disease reporting and the herd veterinarian must be consulted before any specific disease prevention or treatment actions are taken based on the information contained in this report.

This report is provided to dairy farmers in support of better cattle health management with the understanding that neither the author/s or the organisations involved accept any liability whatsoever with regard to any statement, fact or recommendation made in this report.

Service providers
1. Preface

This monthly disease trend report has been specifically developed for dairy farmers. It will be dedicated to the practical discussion of disease trends, which are of specific significance to the South African dairy industry. This is in addition to the general disease trends as reported monthly by the Livestock Health and Production Group of the South African Veterinary Association.

By now you will have received an invitation letter to participate in the disease monitoring and extension system as well as a presentation explaining the background to and the basic functioning of the system. An invitation letter and the presentation will be sent out again to ensure that everybody has received it in order to participate in the electronic disease reporting system.

The main aim of the report is to systematically deal with significant diseases that will be added to the online reporting system and to discuss general trends of importance.

All of this is done so that this information will be used by you in direct consultation with your herd veterinarian. The online disease reporting system will also establish an open electronic communication channel between the dairy farmer and the herd veterinarian.
2. Focus on the insect-borne diseases

There are three insect-borne diseases of significance for dairy production, as all three can cause severe milk losses and abortions.

2.1 Lumpy skin disease
2.2 Three-day stiff-sickness
2.3 Rift Valley fever

Lumpy skin disease is problematic because cases of this disease remain prevalent, while losses can in actual fact be controlled through effective immunisation with a highly effective vaccine which is commonly available.

Three-day stiff-sickness is problematic because effective protection against this disease through immunisation is not always obtained and currently the availability of the vaccine is unreliable.

Rift Valley fever is problematic because this is a disease that occurs with unpredicted intervals which can be longer than seven years. During these intervals livestock farmers discontinue immunisation and a totally susceptible livestock population develops, which cannot be immunised in time when an outbreak occurs.

Below is a practical overview of the three diseases
<table>
<thead>
<tr>
<th><strong>Lumpy skin disease</strong></th>
<th><strong>Three-day stiff-sickness</strong></th>
<th><strong>Rift Valley fever</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organism</strong></td>
<td>Virus</td>
<td>Virus</td>
</tr>
<tr>
<td><strong>Distribution</strong></td>
<td>Medium and high rainfall areas of SA but need updated information of distribution</td>
<td>Medium and high rainfall areas of SA but need updated information of distribution</td>
</tr>
<tr>
<td><strong>Transmission</strong></td>
<td>Biting insects, ticks and semen.</td>
<td>Mosquitoes and other biting insects.</td>
</tr>
<tr>
<td><strong>Livestock affected</strong></td>
<td>Beef cattle, dairy cattle</td>
<td>Beef cattle, dairy cattle</td>
</tr>
<tr>
<td><strong>Occurrence</strong></td>
<td>Summer and autumn. Can start 3-4 months earlier in winter rainfall area.</td>
<td>Summer and autumn. Can start 3-4 months earlier in winter rainfall area.</td>
</tr>
<tr>
<td><strong>Disease development in the animal</strong></td>
<td>Incubation period is about 2 weeks before signs of disease are seen. Virus target the skin cells and the cells that forms the lining (mucosa) of the internal organs. Animals develop a fever, are lethargic, stop eating, become lame and can abort. The disease may be confused with pseudo lumpy skin disease, which is caused by a herpes virus (bovine herpes virus 2).</td>
<td>Incubation period is less than 1 week but can be as short as 48 hours. Virus target the cells that form the lining (endothelial cells) of the small blood vessels and causes lowering of the calcium levels in the body. Sudden drop in milk production, weakness, saliva flow, nasal discharge, shifting lameness, and some animals can go down. Initially high fever which can decrease to normal and rise again. The signs can easily be confused with milk fever. In dairy cattle a condition named atypical three-day stiff-sickness can develop where the lungs get severely affected resulting in air accumulation under the skin between and behind the shoulder blades.</td>
</tr>
<tr>
<td><strong>Signs of disease</strong></td>
<td>Nodules in the skin (involve the full thickness of the skin attached to the underlying tissue) and in the lining (mucosa) of internal organs especially the trachea and lungs. Very high percentage of susceptible cattle can be affected (up to 100%). Animals develop a fever, are lethargic, stop eating, become lame and can abort.</td>
<td>The signs can easily be confused with milk fever. In dairy cattle a condition named atypical three-day stiff-sickness can develop where the lungs get severely affected resulting in air accumulation under the skin between and behind the shoulder blades.</td>
</tr>
<tr>
<td><strong>Main effects on dairy production</strong></td>
<td>In lactating cows there is a drop in milk production with the possibility of secondary bacterial infection in the udder, respiratory tract, genital tract and intestinal tract. Further loss of milk production due to abortions.</td>
<td>Rapid reduction in milk production and cows in last third of lactation can dry up. Further loss of milk production due to abortions in a small percentage of late pregnant cows.</td>
</tr>
<tr>
<td><strong>Prevention</strong></td>
<td>Highly effective attenuated live vaccine that gives solid protection after the second and annual vaccination.</td>
<td>Attenuated live vaccine for stimulating immunity is produced in South Africa. Vaccine availability during critical periods is currently problematic.</td>
</tr>
<tr>
<td><strong>Treatment</strong></td>
<td>No primary treatment against the virus is available. Symptomatic treatment and antibiotic treatment to protect against secondary bacterial infection of the lesions caused by this viral disease.</td>
<td>No primary treatment against the virus is available. Symptomatic (anti-inflammatory and calcium) and antibiotic treatment to protect against secondary bacterial infections in especially the lungs.</td>
</tr>
</tbody>
</table>

**DISEASE MONITORING AND EXTENSION SYSTEM FOR THE SOUTH AFRICAN DAIRY INDUSTRY**
Summary of disease control actions that need to be taken by the South African dairy industry in the control of lumpy skin disease and three-day stiff-sickness:

**Action 1.**
Updating and mapping of the current distribution of lumpy skin disease and three-day stiff-sickness as identified by dairy farmers and their herd veterinarians to establish the importance of this disease for the dairy industry.

**Action 2.**
Monthly monitoring and reporting of cases of lumpy skin disease and three-day stiff-sickness to increase awareness and stimulate the on-going the need to prevent this disease.

**Action 3.**
Total control of these two disease in the South African dairy industry through prevention by the regular supply and administering of vaccines to susceptible animals as determined by the dairy farmer in consultation with the herd veterinarian.

Summary of disease control actions that need to be taken by the South African dairy industry in the control of Rift Valley fever:

**Action 1.**
Continuous monitoring and immediate reporting of any suspected case of Rift Valley fever. Develop and maintain communication channel for early warning or disease distribution updates when necessary or during an outbreak.

**Action 2.**
On-going awareness campaign and reminders about the need to vaccinate all replacement animals at least twice against Rift Valley fever in order to prevent the development of a susceptible dairy cattle population.
3. Call for registration and participation in the system.

The most important action for dairy farmers is to understand the need for a dedicated and interactive communication channel and then to register on the electronic disease reporting system.

The goal is to update the current distribution of diseases, creating awareness and basic understanding of the disease development process of different diseases in order to identify better disease prevention and/or treatment actions. The latter is always done in conjunction with the herd veterinarian.

Individual information from a farmer is only shared with the veterinarian who is nominated by the farmer when he/she registers on the system.

For development of the monthly disease trend report per district (town), the Veterinarian Network system administrators only use collective data with no identification of the farmer that reported the disease through his/her veterinarian.

Reporting will initially start with the insect-borne diseases, tick-borne diseases and some other basic diseases. The first step will be to determine the distribution for these individual diseases as pertaining to the dairy industry.

The invitation letters with the username and password that can be used, will be sent out again to dairy farmers who haven’t registered yet. There will also be an e-mail address which you can reply to, should you need more information.
4. Specific comments of importance to the dairy industry, related to the monthly disease trends, as reported by veterinarians of the Livestock Health and Production Group of the South African Veterinary Association.

4.1 Internal parasites – Flukes
4.2 External parasites – Blue ticks
4.3 Tick-borne diseases – African vs. Asiatic redwater
4.4 Bacterial diseases – Anthrax
4.5 Plant poisoning – Kikuyu poisoning
4.1 Internal parasites – Flukes

The February disease report shows very low reported levels of fluke infestations. Due to the favourable environmental conditions in large parts of South Africa it is expected that infestations with these parasites will increase significantly during the next 3 months. Steps need to be taken to prevent large infestations during autumn because these lead to severe production losses, as treatment is normally only actioned once the first signs of disease are observed and significant losses would already have been incurred.

Infestation with these parasites can be problematic during the autumn and the disease development process is shared below in order for dairy farmers to understand the need for disease prevention and/or treatment.
Every year both these internal parasites cause major on-going losses and mortalities in South Africa. Control can only be improved through a better understanding of these parasites.

**Liver flukes**
A parasite that occurs in the liver of cattle, sheep and goats causing damage to this vital organ.

- **Immature liver flukes** tunnel through the liver while they feed and grow.
- **Adult liver flukes** live in the gall tubes and suck blood from the walls of the tubes.

**Conical (stomach) flukes**
The adult flukes are found in the big stomach (rumen) but the damage is caused by the young flukes in the small intestine of cattle, sheep and goats.

- **Adult stomach flukes** live in the big stomach (rumen) and produce eggs.
- **Immature stomach flukes** live and feed from the wall of the small intestine.

The general name for this stomach fluke is conical fluke due to the conical shape of the adult flukes.

The liver is damaged by the immature flukes that tunnel through the liver tissue. The adult flukes in the gall tubes draw a reaction from the body and the tubes become thickened and can be obstructed by the flukes.

The lining (wall) of the small intestine is severely damaged by the immature flukes, which cause wounds, causing blood components to seep into the intestine, causing foul-smelling watery diarrhoea.
Life cycle of flukes in the environment

Winter
Adult liver and stomach flukes inside livestock produce eggs that are excreted with the manure. Eggs in the manure hatch when the environmental temperature rises above 22°C.

Spring
At this stage of the parasite it must be washed out of the manure by rainwater into areas with standing water. Freshwater snails become infected by this stage of the flukes. These flukes will now multiply inside the freshwater snail.

Summer and Autumn
During the period of high rainfall, the flukes that have multiplied inside the freshwater snails are released into the water again. At this stage, the flukes can initially swim. The small flukes swim until they reach a plant that grows in the water. They will attach to the plant and form a protective capsule around it. This is the stage that is infective for livestock and in this form, the small flukes can survive for only a few months if the area becomes dry. If the area stays wet, these encapsulated flukes can survive for longer periods, especially in the case of the infective stage of the stomach fluke, that can infect livestock well into the winter months.

Liver fluke
Conical (stomach) fluke

Fresh water snails are active during late spring, summer and early autumn

Safer period to graze wetlands
Danger period to graze wetlands on infected farms
Liver fluke – detailed understanding of the disease process that takes place inside the animal

**Start of infection**
The signs of disease will depend on the number of infective flukes (high, medium or low) ingested by the animal. The signs that will be seen with a medium to high infection, are described here.

**Week 1-8**
Animals show rapid weight loss, weakness, signs of blood loss and even sudden death if the infection rate is extremely high.

**First signs of disease**

**>12 Weeks**
Affected cattle can lag behind when herded or develop bottle jaw – a sign of slow blood and protein loss. Continued weight loss especially during the period when the grazing is poor.

**Examination of dead sheep**
When a veterinarian cuts open the dead animal, he will look for signs of liver damage (thickened gall tubes) and flukes in the gall tubes.

**Diagnosis of infestation in live animals.**
To confirm infestation in the live animal, manure must be collected and sent to the veterinarian for tests to determine if there is a liver fluke infestation. The latest tests can identify the infestation early (from 4 weeks after infestation), which will be at the time when the first signs of disease are observed in the case of a very severe infestation.

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**Development of liver fluke inside cattle**

When animals graze in wet areas they ingest the immature flukes which are attached to plants.

**Inside the animal** these immature worms move through the wall of the small intestine, migrate to the liver and penetrate the liver.

The immature flukes will then start to eat liver tissue, forming small tunnels in the process.

**Immature growing worms feed on the liver for the next 6-8 weeks** while causing severe damage to the liver. **Liver damage depends on the number of immature flukes feeding on the liver tissue.**

By 8 weeks, they become adult flukes that enter the small bile ducts (tubes) and migrate to the larger bile ducts.

This adult flukes attach to the wall of the bile ducts and feed by drinking blood. After a month each adult starts to produce eggs (20 000 per day) which go with the bile into the intestine and out with manure.

The thin walls of the bile ducts now become thickened and white and the whole liver can become hard (fibriotic) owing to the body’s reaction to this infestation.
Start of infestation
No signs of disease can be observed and the animal will look healthy and will eat and produce normally.

Week 1-8
The first signs of disease are that the animals stop eating, develop severe foul-smelling and watery diarrhoea and lose condition rapidly. Many animals can die when there is a severe infection.

> 12 Weeks
The adult stomach flukes cause no harm to the animal and no signs of disease are apparent.

Examination of the dead animal
When a veterinarian cuts the dead animal open he/she will look for the presence of immature flukes in the small intestine and signs of damage of the small intestine.

Development of stomach flukes inside cattle, sheep and goats
When the animals graze in wet areas they ingest the immature flukes attached to plants.

Inside the animal these immature flukes go to the small intestine where they lose the protective capsule that was protecting them in the environment.

They now attach to the wall of the small intestine with very strong suckers in order to drink blood.

The immature flukes suck a piece of the lining of the intestinal wall into their body opening, which causes damage to and holes in the lining of the intestine. This causes blood components to leak into the intestine.

The damage depends on the number of immature flukes, which will become adults after 6-8 weeks.

This adult worms migrate to the big stomach (rumen) where they will attach without causing damage to the animal.

After 4 weeks they will start to produce eggs that will pass out with the manure onto the grazing.

Under the right conditions, these eggs will hatch to infect the fresh water snails again.

Diagnosis of infestation in live animals.
To confirm infestation with immature stomach flukes in the live animal, at least a dessertspoon full of the watery dung must be collected when the first signs of diarrhoea are observed. This must be sent to the veterinarian for microscopic tests to determine if there is an immature stomach fluke infestation.
4.2 External parasites – Blue ticks

The February 2014 report shows high levels of blue tick infestations. While we expect the levels to peak during February – March there are very few reports of blue tick resistance. It is suspected that there is underreporting of this problem and we urge farmers to discuss this with their herd veterinarians if there is a problem in controlling blue ticks during the next two months.

Infestation with blue ticks (Rhipicephalus sp.) can be a problem during autumn and the tick development process on the animal for this one host tick is shared below in order for dairy farmers to understand the options available for control of this parasite.

These ticks transmit redwater and anaplasmosis in cattle.
Blue ticks – understanding the disease process that takes place on the animal

**Week 1**
*Start of infestation -*
The very small ticks (larvae) are not easy to see because they are as big as the head of a pin. The animal’s coat (hair) will still look smooth.

**Week 2**
The small ticks (nymphs) are still not easy to see because they are now as big as the head of a match. During a closer inspection nymphs can be seen in areas where the hair is short, like on the neck fold (dewlap) and backside of the upper back legs.

**Week 3**
Flat adult ticks are still not clearly visible. The first adult engorged blue tick females become visible three weeks after having climbed on the cattle as small ticks (larvae). Hereafter large numbers of newly engorged blue ticks will be seen on a daily basis until animals are treated.

**Inspection after treatment with a dipping compound.**
If the treatment was successful, no engorged female blue ticks should be visible one week after treatment.

**Length of development** = three weeks (21 days) until engorged female blue ticks are visible

The tick larvae hatch from the eggs on the ground when the weather is hot enough. These larvae will climb onto grass leaves and seed heads and wait for cattle to brush past when grazing. They then climb onto the cattle and attach by making small holes in the skin with their mouths. Then they start sucking blood from the small blood vessels in the skin and grow.

After one week the larvae will molt (change their skin) to become nymphs, which will attach again, suck blood and grow further. It must be taken into account that new infestations with larvae will still take occur continuously, adding to the total number of ticks on the cattle.

After the second week, the nymphs will molt to become adult ticks, which will attach and feed. At this stage the females are still flat and they will find a male to mate with. After mating at the end of the third week, the female ticks will quickly suck blood and become engorged overnight. The next day they will detach, fall off and produce up to 2 500 eggs.

Effective treatment
A dipping compound must kill all the ticks from very small to adult, present on the cattle at the time of treatment, and must further protect against new infestations for up to one week after treatment.

This part of the disease process is not easily visible

This part of the disease process is easily visible during weekly inspection of the cattle early in the morning.
4.3 Tick-borne diseases – African (*Babesia bigemina*) vs. Asiatic redwater (*Babesia bovis*)

Trends show that Asiatic redwater is increasing. The disease transmission process is shared below in order for dairy farmers to understand the need for disease prevention and/or treatment.

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**Week 1 – Start of infestation**

- Transmission of Asiatic redwater from day 1 after attachment of the larvae.

**Week 2**

- Transmission of African redwater from day 9 after the start of infestation. Transmitted by the nymphs.

**Week 3**

- African redwater can also be transmitted by adult ticks.

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**Asiatic redwater** is only transmitted by the pantropic blue tick (*Rhipicephalus microplus*).

**African redwater** is transmitted by the ordinary blue tick (*Rhipicephalus decoloratus*) as well as the pantropic blue tick (*Rhipicephalus microplus*).

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**Action 1.**

The herd veterinarian must confirm which type of redwater is occurring on a specific farm when there are clinical cases.

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**Action 2.**

If Asiatic redwater is diagnosed, the prevention and treatment actions must be adapted in order to control this blood parasite that can be transmitted as soon as larvae attach and start feeding on susceptible cattle.

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Because there is such a major difference between the disease transmission and the disease process that take place within the animal, these two diseases must be viewed as two individual diseases in order to prevent major losses.
4.4 Bacterial diseases – Anthrax

An outbreak of anthrax was confirmed in Lesotho, bordering South Africa, and this information obtained through the OIE (World Organisation for Animal Health) website is shared to increase the awareness of continued vaccination.

Any case of anthrax is of significance. Due to the fact that the outbreak occurred close to the border with South Africa (Eastern Free State) it must raise increased awareness. From feedback received it seems that farmers bordering Lesotho were rapidly starting to vaccinate, causing a shortage of vaccines according to feedback received.

Action 1.

Anthrax vaccine is a modified live vaccine that gives very good protection against the disease. Ensure that the yearly vaccination is up to date.
4.5 Plant poisoning – Kikuyu poisoning
A number of cases were reported in the Eastern Cape and this is shared to give an example of the need for early reporting in order to create immediate awareness and prevention of this problem during periods when environmental conditions are optimal for the development of this disease condition.

This disease condition is currently managed as it occurs or prevented through nutritional management if dairy farmers are warned as soon as the first case occurs. This is a very good example for the need of a electronic communication channel between veterinarians and veterinarians and their dairy producer clients.

<table>
<thead>
<tr>
<th>PROVINCE</th>
<th>Mpumalanga</th>
<th>Gauteng</th>
<th>Limpopo</th>
<th>North West</th>
<th>Free State</th>
<th>Kwazulu-Natal</th>
<th>Eastern Cape</th>
<th>Western Cape</th>
<th>Northern Cape</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.0 (4)</td>
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</tr>
</tbody>
</table>

Level of importance scale: 1 = one case, 2 = more than one case but less than ten and 3 = more than 10 cases reported

**Eastern Cape**

**Alexandria, Alexandria Platteland Spreekkamer**
Dairy: 3
2 outbreaks with fortunately only about 10 animals affected in each outbreak – 4 deaths confirmed in total. Was perfect year for poisonings, but farmers prevented poisoning in general by adhering to grazing advice and feeding enough dry roughage.

**Humansdorp, Humansdorp Veterinary Clinic**
Dairy: 3
Commando Worm associated kikuyu poisoning – hot, dry weather followed by rain – acute death – some cows show symptoms of dehydration and large fluid filled rumens. Most effective treatment was removal of animals from pastures and making sure their feed is supplemented with good quality silage/hay.

**Jeffreysbaal, Cape Cross Veterinary Hospital**
Dairy: 3

**Uitenhage, Uitenhage Dierehospitaal**
Dairy: 3

Army worm outbreak om kikuyu grazing
Also see the full report on the website of Milk SA, that gives an overview of all the disease trends for February 2014, as reported by the Livestock Health and Production Group of the South African Veterinary Association.

There are also maps that give an indication of the distribution of the different diseases as reported during February 2014.

A high number of veterinarians (104) submitted reports for the month of February and for the first time all the reports were entered into the electronic system that was developed for this purpose.