



DEPARTMENT of  
AGRICULTURE  
Provincial Government of the Western Cape

VETERINARY SERVICES

WESTERN CAPE PROVINCIAL VETERINARY  
LABORATORY, STELLENBOSCH

# LABORATORY NEWSLETTER

November 2011

Volume 1, Issue 1

## EDITORIAL

The Western Cape Provincial Laboratory in Stellenbosch aims to produce an excellent diagnostic service for our departmental colleagues, private veterinarians and livestock producers. This newsletter will be published once every 2 months and will be distributed by email to laboratory staff, state veterinarians, state veterinary technicians and those private veterinarians who use the services of the laboratory.

The newsletter will also be published on the departmental website [www.elsenburg.com](http://www.elsenburg.com).

The purpose of the newsletter is to share interesting, informative and beneficial information with our readers. Most of the articles will be case studies derived from submissions made to the laboratory. Others will be "the best samples to take", "how such-and-such a test is performed", "how do we know the results are accurate" and "what next" type of articles. These articles will be written by all the laboratory staff.

Communication is important. Please send ideas and suggestions to [daver@elsenburg.com](mailto:daver@elsenburg.com).

## DAFF APPROVAL FOR LABORATORY

After months of preparation all the Controlled Disease tests at the Provincial Veterinary Laboratory (PVL) in Stellenbosch were audited by the National Department of Agriculture, Forestry and Fisheries (DAFF) in September 2010.

After clearing the non-conformances the PVL was issued with a Certificate of DAFF Approval on 4 May 2011 to perform Controlled Disease testing. With six of the PVL sections performing Controlled Disease testing the PVL has one of the most comprehensive DAFF approved schedules in the country, with no fewer than 21 test methods approved.

In addition to Controlled Diseases, the Food Safety section was also audited by DAFF and four test methods were approved. This has been a huge team effort by all the staff at the PVL, from cleaners to veterinarians, as all aspects that bear an influence on sample testing were looked at.



*In the photo: Ms Jane Banda (Quality Controller, PVL) hands over the Certificate of DAFF Approval to Dr Tertius Gous (Deputy Director: Veterinary Laboratory Services).*

## 2011 : A PRODUCTIVE YEAR

2011 has been a busy year for the Western Cape Provincial Veterinary Laboratory. Besides routine and surveillance diagnostic work, laboratory personnel have taken an active part in the diagnosis and control of the Rift Valley Fever, Avian Influenza and Horse Sickness outbreaks which have occurred in the region during this year. On average during this year the laboratory has registered 700 submissions per month (with a total of 10 000 diagnostic specimens per month) and performed 13 000 diagnostic tests per month. Congratulations go to all staff at the laboratory who have worked in a friendly, co-operative and efficient manner with the emphasis on superb service delivery.

# Abortions in sheep caused by Toxoplasma

During October about 40 abortions occurred within two weeks on two farms of one owner in the Malmesbury and Paarl districts. There were more or less 300 ewes in two separate herds, managed independently and kept on intensive grazing.

The abortions occurred mostly in late gestation. The foetuses did not show specific gross lesions and no specific bacteria were isolated. A tissue pool of foetal organs tested negative for *Chlamydomphila abortus* with a PCR test.

A few large parasitic cysts associated with microglial nodules were seen microscopically in the foetal brains. These cysts were identified electron microscopically (figure 1) as those of *Toxoplasma gondii*.

The serum of 11 ewes which had aborted was tested for *Toxoplasma* and *Neospora* antibodies. On one farm 3 out of 6 ewes tested positive for *Toxoplasma* antibodies but none for *Neospora* antibodies. On the other farm 2 out of 5 ewes tested positive for *Toxoplasma* antibodies and 1 out of 5 tested positive for *Neospora* antibodies.

The farm owner mentioned that there are a lot of cats on both farms, in particular in and around a shed on the one farm where the sheep were housed at night.

Cats are the most important definitive host and shed oocysts in their faeces. Oocysts present in feed and water are then ingested by intermediate hosts. The sporozoites, which are released in the intermediate host's small intestine, eventually form cysts in a variety of tissues. They can also be transmitted to the foetus via the placenta when infection occurs during pregnancy. Cats themselves become infected again by eating tissue cysts (for example in mice). It was probably via mice that *Toxoplasma gondii* was spread between the cat populations on the two farms.

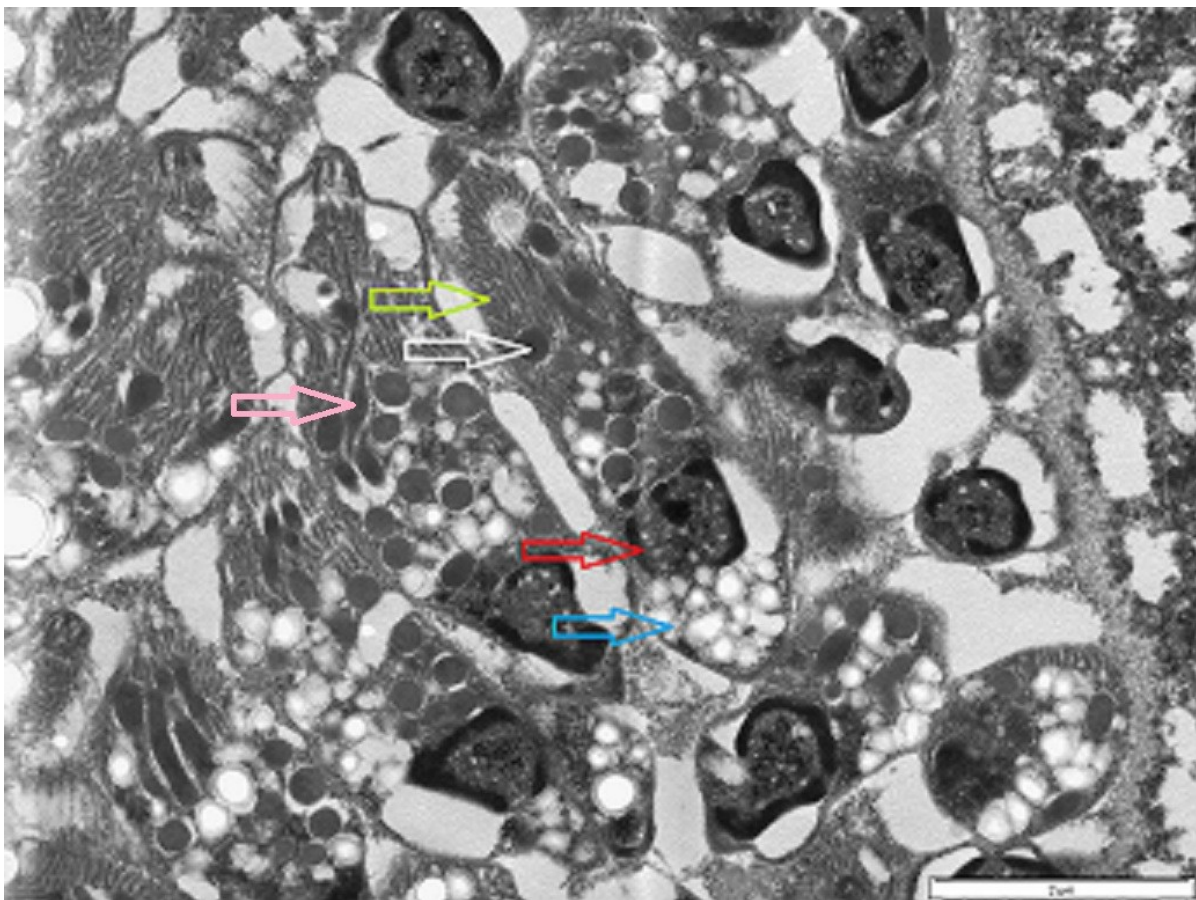


Figure 1: Electron Microscope micrograph showing *Toxoplasma gondii* bradyzoites with anterior micronemes (green arrow), large dense granules (white arrow), rhoptries (pink arrow), subterminal nucleus (red arrow) and posterior amylopectin granules (blue arrow). (Scale 4cm equivalent to 2 $\mu$ m).

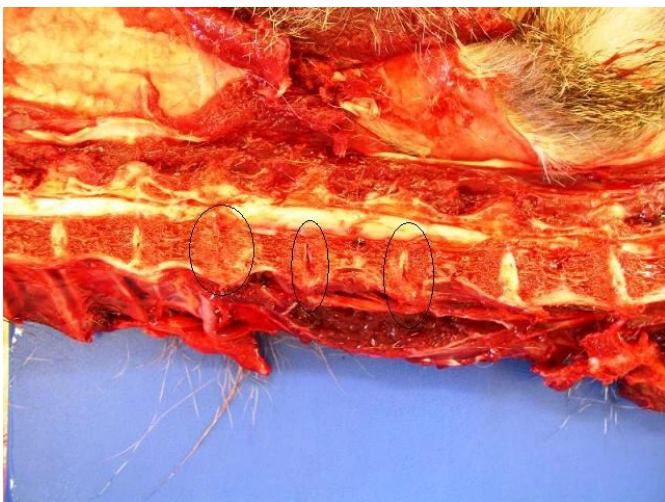
# Intervertebral disc disease in a Vervet Monkey

A fifteen-year-old male vervet monkey was presented for post mortem. Euthanasia was elected after presumptive right femur fracture, progressing to hind limb paresis and loss of control over bladder and bowel movements.

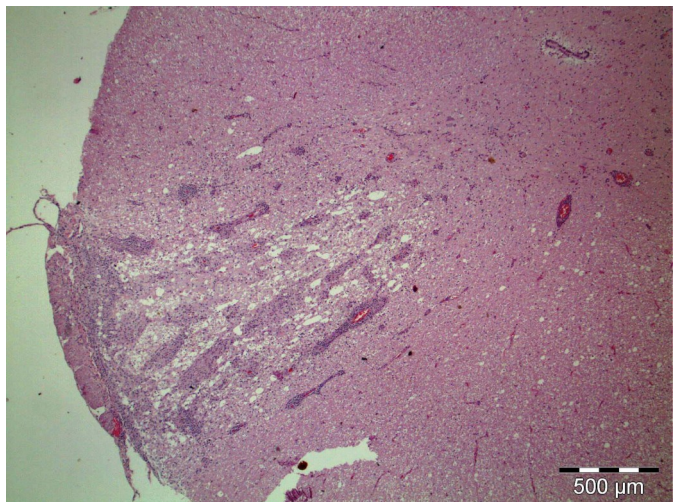
On post mortem, the distal right femur (especially the medial aspect) was thickened by bony exostoses. However, no macroscopic evidence of fractures could be demonstrated. The caecum and colon were severely distended by faecal material, with gas and muco-haemorrhagic material being present in the last part of the colon and rectum.

When the spinal cord was exposed (figure 2), there was narrowing of the intervertebral spaces due to complete loss of the discs between the last thoracic vertebra and the first lumbar vertebra. The next two lumbar vertebrae (intervertebral space L1-L2, L2-L3) were similarly affected.

Histologically, a section of spinal cord within one of the affected areas (figure 3) exhibited a ventro-lateral moderately well demarcated wedge-shaped sector of grey and adjacent white matter destruction (lytic necrosis). Large numbers of foamy gitter cells replaced the normal neural tissue; while perivascular lymphoplasmal cellular cuffing could be seen surrounding most of the spinal cord blood vessels, especially within the necrotic area, but also throughout the rest of the section.



*Figure 2: Gross pathology photograph showing loss of intervertebral discs, narrowing of the disc space and bony exostoses on the ventral intervertebral spaces.*



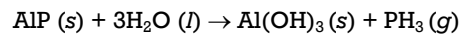
*Figure 3: HE 40X magnification, showing focally extensive area of polio- and leukomyelomalacia .*

Rupture/herniation of the first three lumbar intervertebral discs that had caused compression and necrosis of the spinal cord gave rise to the clinical manifestations observed in this animal. Damage to the spinal column was demonstrated histologically as severe focally-extensive polio- and leukomyelomalacia.

The hind limb paresis and loss of bladder and bowel movement control was caused by the damage to the nervous tissue within the spinal cord, while the bony reaction on the distal right femur was probably a sequel to external trauma.

# Phosphine poisoning due to the feeding of grain siftings ('sweepings')

Phosphine (PH<sub>3</sub>) is a highly toxic gas liberated upon contact of phosphides (e.g. aluminium-, zinc-, magnesium phosphide) with water (e.g. water vapour in the atmosphere) or acid. In the case of aluminium phosphide the reaction is as follows:



Aluminium phosphide is used as a fumigant in grain silos for the control of insects such as weevils. Various phosphides are also used elsewhere for the control of moles and other rodents.

Aluminium phosphide (sold as "Phostoxin" (Degesh) or "Fumaphos" (National Fumigants) ) is added to cereals in silos in the form of tablets or pellets which are formulated to slow down the otherwise strong exothermic chemical reaction by which the phosphine gas is released. Depending on the temperature and relative humidity in a silo, most of the aluminium phosphide should be converted to phosphine within 5 days (the minimum exposure time required to exterminate insects in various stages of their life cycles). However, after the tablets/pellets have released the phosphine gas, a grey-white powder remains. This grey-white powder consists mainly of non-toxic aluminium hydroxide but may contain some residual aluminium phosphide. These small remnants of aluminium phosphide sift out of the main body of grain and become concentrated in the rest of the siftings to reach toxic levels. If ingested by an animal, the residual aluminium phosphide rapidly reacts with water or acid in the rumen or stomach (depending on the species) to release phosphine gas.



Figure 4: "Still waters run deep".

In animals phosphine primarily affects the central nervous system (causing hyperaesthesia, convulsions and coma), the gastrointestinal tract (causing vomiting, colic and tympany) and the respiratory tract (causing polypnoea and dyspnoea). The mechanism of action is unknown.

During 2010, 10 pigs were poisoned by 'sweepings' on two occasions. During April and May 2011 two incidents of phosphine poisoning occurred when siftings obtained from grain silos was fed to livestock. In the one case near Bredasdorp more than 15 Bonsmara cattle died overnight after being fed siftings purchased the previous day. In the other case 3 horses died and 1 was affected after being fed siftings bought 5 days earlier.

In the case of the cattle the bagged siftings, as well as leftovers of sweepings from feeding troughs, tested positive for phosphine (indicating the presence of phosphides). In the cases of the horses and pigs, phosphine could be detected in their stomach contents.

It would appear that some silo operators and livestock owners are not aware that siftings of fumigated grain may still be toxic, even for several days after being released from the silo because they are not sufficiently aerated. Once the grain is sufficiently aerated, so that all the trapped phosphine (PH<sub>3</sub>) gas has been liberated, the grain is completely safe for human or animal consumption. The danger of using grain siftings from fumigated cereals should be clearly stated on the instructions and package inserts accompanying the various fumigation products. This information should also be emphasised at institutes providing training to silo-operators.

# Moraxella bovis keratitis in a ram

Swabs taken from a sheep with a history of keratitis were inoculated on sheep blood agar within an hour of sampling. After 24 hours aerobic incubation at 37°C small white, haemolytic colonies could be seen on sheep blood agar. All the swabs yielded similar moderate slightly mixed growth. A colony smear was made and stained with Gram's stain (figure 5). Very short Gram negative rods (almost cocci) that tended to occur in pairs (indicated by red arrows in the figure below), were seen. The bacterium was catalase and oxidase positive. These characteristics identified it as a *Moraxella* specie.

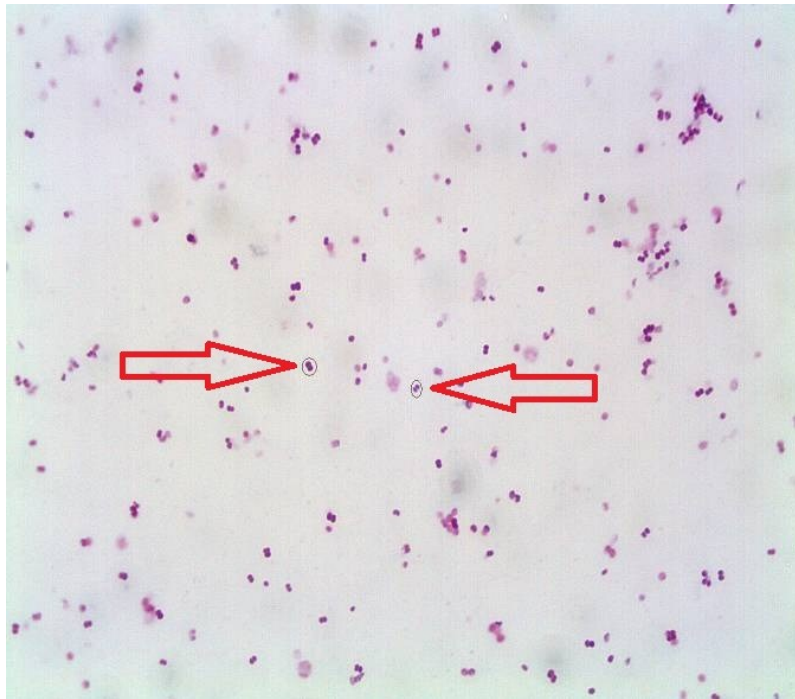


Figure 5: *Moraxella bovis* organisms.

The genus *Moraxella* falls under the family Moraxellaceae in the class  $\gamma$ -Proteobacteria.

These are fragile organisms and samples should be plated as soon as possible, preferably within two hours.

There are several species of which *Moraxella bovis* is probably the most important veterinary pathogen. Identification to species level is challenging because *Moraxella* does not metabolise carbohydrates.

There is also a human pathogen in the genus, *M. catarrhalis*, that causes otitis media, sinusitis and conjunctivitis in children and lower respiratory infection in adults with pre-existing chronic lung infection.

*M. bovis*, the primary agent of bovine infectious keratokonjunctivitis occurs worldwide. It is brought into herds by asymptomatic carriers that carry the organism in their nasal cavities and eyes. Transmission occurs directly via exudates, fomites or cows licking their calves, and indirectly via flies. Outbreaks occur mostly in summer and early autumn. *Bos taurus* and in particular breeds with unpigmented ocular tissue appear to be more susceptible. Predisposing factors are irritants to the eye such as ultraviolet light, dust, wind, tall grass, high ammonia levels and other infections.

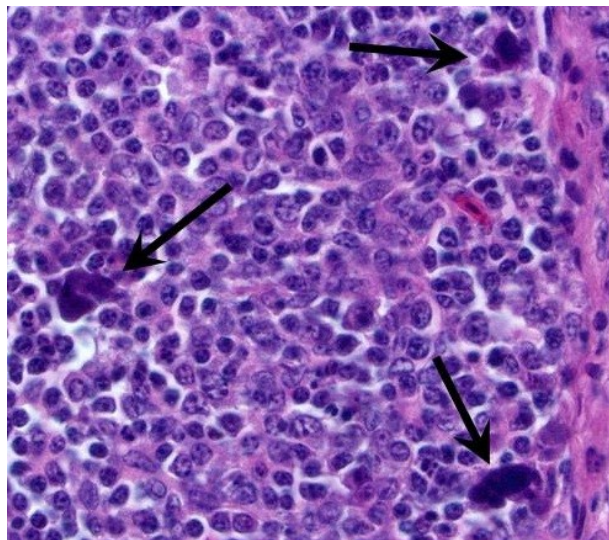
Infection by this highly contagious organism leads to a painful condition that may result in temporary blindness. Clinical signs are blepharospasm, lacrimation, photophobia and chemosis. In the worst cases, keratitis with corneal ulceration and abscessation develop.

Bovine infectious keratokonjunctivitis is an economically important disease, because it leads to reduced growth rate, lower milk production, increased treatment costs and increased labour.

# Circovirus infections in pigeons

Recently two racing pigeon breeders independently sent birds to the veterinary laboratory for post mortem examination. Both pigeon flocks were experiencing mortalities in their young pigeons. In both instances circovirus inclusion bodies were detected in histopathology sections taken from the cloacal bursa. A bird from one of the flocks also tested positive for Pigeon paramyxovirus on PCR, despite having been recently vaccinated against the virus.

Young pigeons in particular are very susceptible to circovirus, which causes immune suppression, wasting and sometimes death. Immune suppression may also compromise the bird's ability to benefit from vaccination because an adequate immune response to the vaccine may not be initiated. Older, recovered birds may be carriers and intermittently shed virus particles in their faeces. Therefore the introduction of new birds may pose a high risk of infection to the resident flock and strict quarantine and hygiene measures should be adhered to upon arrival.



*Figure 6: Lymphoid tissue of the cloacal bursa. Large dark purple circovirus inclusions (arrows) can be seen within the cytoplasm of macrophages.*

## Farewell to colleagues

**Adri Terblanche** retired earlier this year after working at the laboratory for 25 years. In his work he retained the very best of the past and embraced the newest developments. Adri made significant contributions to this laboratory by building up a hugely successful Serology Section. We wish him fulfilment of all his dreams.

**Aletta Geldenhuys** also retired earlier this year after working at the laboratory for 34 years. Aletta provided us with a serene and peaceful environment in which to work. She ensured that the gardens were kept in good trim and her flower arrangements throughout the laboratory were legend. We wish her a joyous retirement.

**Khuthala Funani** left the laboratory in March to return to the work for which she has a passion — forensic clinical pathology. We thank her for her huge input to our Biochemistry Section and wish her every success.

**Nompilo Zuma** left the laboratory in April to return to her home in Pietermaritzburg. Nompilo has a wonderful bubbly effusive character and made immense contributions to the Biochemistry Section. Allerton's gain is our loss.

**Rushni Moosa** transferred to the Department of Health in Somerset West in July. We truly appreciate her hard work in our costing department but know that her transfer will benefit her family greatly.

**Tertius Gous** left the laboratory in October to return to private practice. Tertius is a true scientist, naturalist and "free spirit". He is passionate about photography and ornithology. As Deputy Director in charge of the laboratory, Tertius encouraged all staff to produce their best at all times. He was very progressive and promoted lateral ('out of the box') thinking. We know that Tertius will make significant contributions to Veterinary Science in the years to come and we wish him all of the best.