Katherine Rural Review

DEPARTMENT OF PRIMARY INDUSTRY AND RESOURCES

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Inside this issue:

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You paid for it, now make sure it works

Principles of vaccine handling

Written by Jodie Ward, Beef extension officer Department of Primary Industry and Resources (DPIR) and Lee Taylor, Senior Veterinary Technical Manager, Zoetis

Results from the 2010 Pastoral Industry Survey indicate that a large majority (92%) of the stations on the Barkly routinely vaccinate the herd for botulism, while more than half (62%) of those surveyed annually vaccinate their bulls for vibriosis (Collier, C 2014).

However I ask you, are you confident that you have done the best you can to make sure those vaccines were effective?

Vaccines have been proven to be effective at preventing the targeted disease however once the vaccine has left the manufacturer there are a number of ways that the contents can be rendered ineffective. Below are some tips to ensure your vaccines are effective.

At the station

- Most vaccines need to be kept between 2°C and 8°C at all times, therefore placing a thermometer that can record maximum and minimum temperature in the fridge is ideal for tracking temperature fluctuations and making sure your vaccines are kept in prime working order. While you're there, check the seals on your vaccine fridge.
- When bringing home new vaccines, bring the old stock to the front to be used first and discard any that have passed the expiry date.
- Some vaccines should be used on day of opening, some can be used the next day, some can be used after 30 days of opening. Read the label. Never put opened packs of vaccine back in the fridge with a vaccinator gun still attached. Remove the draw off tube and clean the vaccinator gun.

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NORTHERN TERRITORY GOVERNMENT

- If you have a good quality vaccination gun that needs to be cleaned (as should be done after each session of use), DO NOT use disinfectants or antiseptics as these may interfere with the next vaccine used and damage seals in the gun. The best practice method is to wash the gun out with dishwashing liquid to remove vaccine residue, flush with clean tap water, reassemble the gun, lubricate it (using the manufacturer recommended oil to ensure seals and valves are kept in good order), fill the gun with water and boil vaccination gun for 10 minutes. Air dry the gun and then store the dry gun in a zip lock bag in the vaccine fridge once reassembled.

At the yards

- Invest in a vaccine cooler. Made out of wet suit material, this cheap yet effective device will keep your vaccine out of direct sunlight, and if pre-chilled before use, they will keep your vaccine cooler
- Keep your vaccines in an esky with ice bricks when not being used, such as in between race loads of cattle or during meal breaks. Rather than allowing direct contact between the ice bricks and the vaccine container, wrap the ice bricks in newspaper, this will prevent the contents of the vaccine getting too cold and potentially freezing, rendering it ineffective
- A car fridge on site is an excellent option to store unopened vaccines until they are needed. Make sure to check the temperature is between 2°C and 8°C.

As equally important as setting up the data recording equipment, is the care you take of your vaccine.

- There is a new draw off tube in each pack of vaccine. Use a new one with each pack of vaccine.
- Use clean, sharp needles. Replace needles after every 30-50 head

During transport

- Temperature control and exposure to direct sunlight are important factors to consider during transport as well. If going to town to collect vaccine, leave home prepared with enough space in an esky or car fridge to keep your vaccines cool on your travel home

However, beyond all other recommendations, if you're unsure of what the right vaccine specifications are, it is best to read the manufacturer's instructions inside the box. The key points are to keep vaccines cool and away from light when not in use. Treat them like milk – keep them clean and free of contamination

For more information about vaccination schedules or correct application technique, simply type "vaccine" into the search function of https://futurebeef.com.au/

References: Collier, C. 2014. The 2010 Pastoral Industry Survey - Barkly Region. Northern Territory Government, Australia.

A new face at Katherine Research Station (KRS) – Joe Schmidt

Joe Schmidt is a veterinary officer for the Northern Australia Quarantine Strategy (NAQS) NT program for the federal Department of Agriculture and Water Resources.

He grew up in Tennant Creek, graduated from Murdoch University in 1997, worked in private practice in Darwin, was an on-course race veterinarian for Darwin Turf Club, and has completed a year's equine surgical internship at Scone Veterinary Hospital in the Hunter Valley, NSW.

Joe joined the NAQS program in 2006 and, as a field veterinary officer, conducts surveys of domestic and wild animal populations in remote areas of the Northern Territory coast and Papua New Guinea for exotic pests and diseases. He works closely with Indigenous ranger groups, pastoralists, park rangers and the public to educate them about these threats.

His career highlights include securing a memorandum of understanding with Bradshaw and Yampi Sound military training bases, and Kakadu National Park which allows NAQS personnel to survey these restricted areas for exotic pests and disease.

He has made lifelong friends throughout northern Australia's remote communities and Papua New Guinea, and has been involved in the set-up of the first Indigenous-run sentinel cattle herd in the Northern Territory.

Joe has relocated to Katherine with his wife, three daughters and their menagerie of 15 chooks, five horses, three dogs, two cats, one baby possum, and a British Alpine milking goat called Hootie Bella Star! His wife, Sam, is working with Roper Gulf Shire providing veterinary services to remote communities. He is looking forward to exploring the greater Katherine area with his family, becoming active members of the Katherine Horse and Pony Club, working with biosecurity team here at the KRS, and carrying out NAQS surveillance building on the working relationships with primary producers in the Timber Creek and Gulf regions.

New zero till planter assists cropping program at Katherine Research Station

By Callen Thompson, Senior Extension Agronomist, Katherine

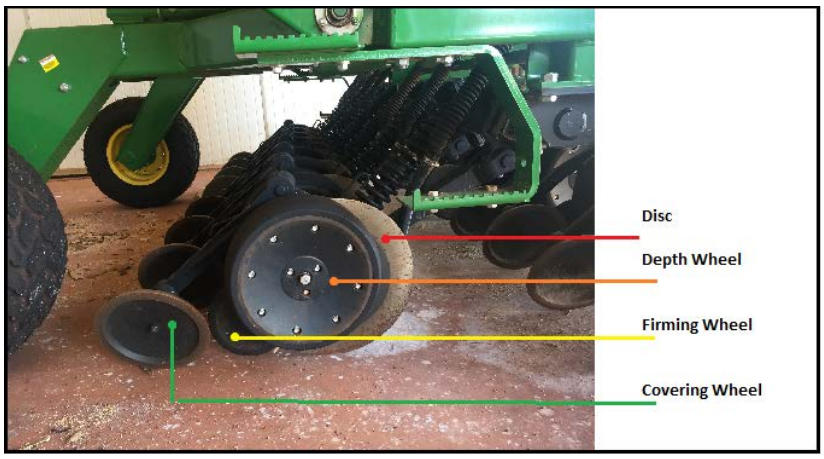
In December staff at Katherine Research Station took delivery of a 1590 John Deere single disc planter. The new planter will allow field experiments to be sown using zero till principles. The planter will also be used to sow demonstration paddocks and improved

pasture for DPIR livestock research on Katherine Research Station and Douglas Daly Research Farm.

The benefit of this planter is that it is able to sow into heavy stubble loads and residue from previous crops or pasture. This means that paddocks do not need to be cultivated or burnt prior to sowing. Retaining stubble increases the soils ability to conserve moisture and limits hard setting. Stubble cover will also reduce soil temperature, which will increase seedling survival.

An added advantage of zero till is that the combination of stubble cover and reduced soil disturbance leads to reduced early weed seed germination. The resulting reduced competition increases crop establishment and leads to a reduced need for weed spraying operations.

The John Deere planter has a single disc opener rather than a tine. The disc cuts a slot through the soil and stubble then the seed and fertiliser falls into the slot. Cutting a slot in the residue results in no residue being dragged along by the planter as can happen with tined planters. A firming wheel pushes the seed into the soil to enable good seed to soil contact and a covering wheel closes the slot.



The way the sowing unit is designed allows for more accurate seed placement and depth control. One of the critical factors in sowing pasture is seeding depth. Pasture seed is often small and can lack the ability to germinate from depth. Most pasture seed should be sown at around 10mm or less. The John Deere planter has a depth wheel that stops the seed from being sown any deeper than the operator desires.

The new planter will be a great asset to DPIR staff as they evaluate new crops and pastures for northern Australia. For more information on zero till, or assistance when setting up your planter check out the links below or contact Callen Thompson on 8973 9724.

Agnote 311: What should my no-till planter look like?

https://dpir.nt.gov.au/__data/assets/pdf_file/0011/233102/311.pdf

Striking the Balance. Sustainable Farming and Grazing Systems of the Semi-arid Tropics of the Northern Territory

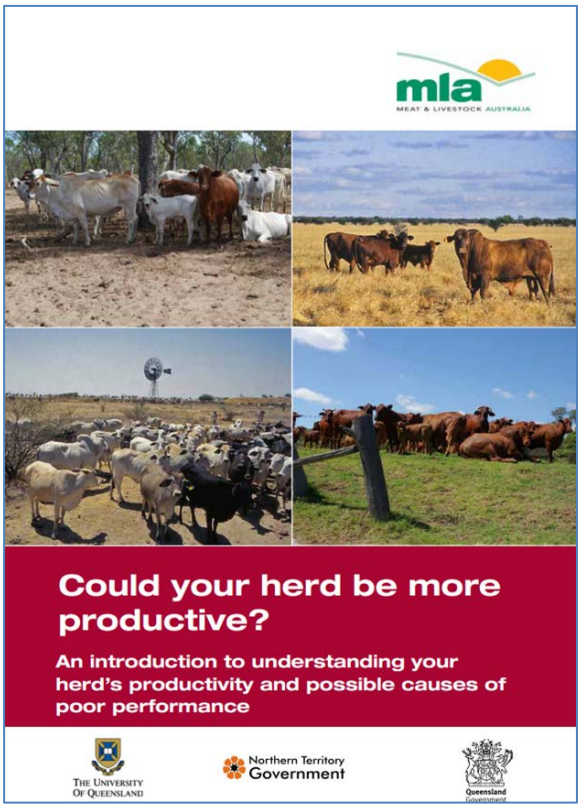
https://dpir.nt.gov.au/__data/assets/pdf_file/0007/227617/ip11.pdf

Have you seen it?

The CashCow Project has released yet another publication for pastoralists titled “Could your herd be more productive?” Using the data collected from over 78,000 cows from 142 breeder mobs across northern Australia between 2008 and 2011, the CashCow team have been able to identify the main causes of low productivity for the four regions, from which they have created this comprehensive eight page document. In an easy to read format, with ‘if this, then that’ functionality, this really is a ‘must read’ for people managing cattle and rangelands in the north.

Co-authored by DPIR’s own Kieren McCosker, this document outlines the four steps to herd productivity:

1. Recording the right information.
2. Understanding what is achievable in your environment.
3. Identification of low productivity.
4. Assessing the management options to address the identified issues.
5. Another selling point for this publication is that it outlines what is possible for each region, as well as the average and typical range of the herds observed for annual weight gain of steers, weaner production and cow performance with links to tools that can assist you with making economic decisions.



All of this is provided to you for absolutely free.

Download it today at: https://futurebeef.com.au/wp-content/uploads/CouldYourHerdBeMoreProductive.pdf (748 KB)

Or contact your local Livestock Industries Development Extension Officer, Jodie Ward, for a hard copy: 08 8973 9730 or Jodie.Ward@nt.gov.au

AGRICULTURE AND FOOD
www.csiro.au

Climate in the Top End

We'd like to share with you what we've learnt about climate forecasts in the Top End.

We'd like to hear from you about what you need from a climate forecast.

What causes a 'good wet'? Why was there a 'bad wet'?

Can we forecast what this year will bring?

Why didn't La Niña give me a good year?

Will there be a dry break in February for me to muster/move trucks/make deliveries?

We would like to invite you to a one day workshop to learn more about the climate of your region and to help us learn more about your climate-related decisions.

- Come and hear about El Niño, the Indian Ocean Dipole, and the Madden Julian Oscillation.
- Find out how they affect the weather on your property and access to roads around you.
- Learn where to get the most up to date climate forecasts for the wet season ahead.
- Discuss what climate change will mean for you.
- Talk to climate scientists about the sort of information you would like to know.
- Work with us to develop the sort of information tools you need to make your decisions.

Darwin - 6th April, Berrimah Farm, 9am-2pm

Katherine – 7th April, Paterson Room, Katherine Research Station

Douglas-Daly – 8th April, TBA.

Please RSVP – Eva Zinkovsky
Eva.Zinkovsky@csiro.au
(02) 6246 4062

Department of Trade, Business and Innovation

The Department of Trade, Business and Innovation Small Business Champions are the key point of contact for Northern Territory business owners, Indigenous enterprises and not for profit organisations looking to improve their profitability, sustainability or capability. Servicing all areas of the Northern Territory, Small Business Champions have an extensive network of contacts, information, tools and resources to help facilitate development and sustainability within the local business community.

Introducing your local Small Business Champions Ken Orwell and Jessica Powter

Ken covers the Roper and Carpentaria Highways including Ngukurr, Numbulwar and Borroloola and Jessica covers the Victoria River District including Kalkarindji and Lajamanu. They can meet with you and confidentially discuss your business needs, offering referrals to Northern Territory Government, Federal Government and non-Government programs including those outlined below. Please visit https://business.nt.gov.au/ or call Ken on 08 8973 8118 and Jessica on 08 8973 8434.

Business Growth Program - The program offers financial assistance to engage suitably qualified consultants to deliver improvement strategies.

Services offered under this suite of programs include:

- business overview
- business planning
- integrated management systems
- mentor support
- business solutions
- information technology solutions
- digital solutions
- tender solutions
- employment solutions
- governance solutions

Roper River
Landcare Group Inc

Mountain Valley Station Field day, Central Arnhem Road 11th April 2017

Management activity discussions

AGENDA

- 0930 – arrival and smoko
- Welcome (background / purpose)
- Introductions / RRLG overview
- Grader grass discussion / WMB update / Previous grader grass trial overview
- DPI&R Improved pastures, weeds and research opportunities
- Property drive and pasture discussions – Competition species for grader grass, pasture ID and dynamics
- LUNCH - BBQ
- Rangelands monitoring discussion
- Fire discussion – Bushfires NT update, planning for 2017, nomination of a fire warden for district, strategic operations, cross boundary ops, incendiaries / matches, equipment subsidy
- Central Arnhem Road update – providing a schedule of proposed works, opening grade timing, full maintenance grade and closing grade, any other related business.
- Other discussion
- Close – 1600

Cropping systems being assessed at KRS

Callen Thompson, Senior Extension Agronomist and Teagan Alexander, Technical Officer, Katherine

Growing irrigated and dryland crops through the wet has kept KRS technical staff busy of late. They are currently growing soybeans for grain and burgundy bean and cavalcade for hay.

Soybeans

The soybeans are being grown in partnership with Archer Daniels Midland (ADM) to assess the economic viability and agronomic suitability of soybeans in northern Australia. The Hayman variety is currently being grown; this variety was bred by Andrew James (CSIRO) and is marketed through Seednet. Hayman is a high yielding variety that has the ability to produce high quality grain that can be used to make tofu. The trial also has an evaluation strip of an experimental variety (Andrew James, CSIRO).

Half the paddock is being irrigated when required and the other half is rain fed only. The purpose of this is to evaluate the potential of soybeans as a dryland crop. Given the current 2017 wet season conditions there is very little difference in growth, though we would suggest that this is not a “normal” season and dryland production would be a greater risk than irrigated. We will investigate both the agronomic and economic factors of these two irrigation management options.

One of the benefits of Hayman soybeans is the high amount of dry matter produced. Producers in Northern NSW are growing Hayman as high protein hay and silage crops. In a dryland situation, NT producers may look at sowing Hayman as an each way bet. If the season is good, and there is a high possibility of receiving good grain yields, producers would take the crop through to harvest. If the season is poor or the wet season is short, they would have the option to cut for hay or silage. Due to the desiccation of the plant when producing grain, it is not viable to bale the stubble after the grain is harvested.

Burgundy beans

Burgundy beans are being trialled to possibly offer an alternative to cavalcade as they both have a high protein content, high palatability and act as a nitrogen fixer. Two burgundy bean varieties, garnet and presto, have been supplied by Heritage Seeds. Again one half of the paddock is irrigated and the other half is dryland. Yield and quality will be assessed and compared to the industry standard, cavalcade.

The two varieties of burgundy bean are new to the Territory. The dryland bay will be managed as producers currently grow cavalcade and dry matter yield will be collected and compared. The irrigated bay will be assessed to see how much dry season production is achieved. It is hoped that garnet, having some cold tolerance, will produce more growth in the dry season. Both management strategies will be grown through the year and the economics of irrigating through the dry season will be assessed.

The economics of both soybean and burgundy bean grown under the different management strategies will be assessed at the end of the field work. It is not expected that soybeans under overhead irrigation sourced from ground water will be economically profitable. The economics may be profitable in a dry land crop (season dependent) or in a cropping system that is fed by surface water such as the Ord irrigation scheme. Once the dam and water reticulation system is built, this is a more cost effective source of irrigation water.

If you are interested in learning more about the crops at Katherine Research Station, come along to our field walk Tuesday the 4 April at 9.00am. For more information contact Callen Thompson 8973 9724.

Katherine Research Station wet-season crop and hay field walk

Come to the Katherine Research Station to gain an insight into crop evaluation work conducted by the Department of Primary Industry and Resources (DPIR). DPIR staff, together with speakers from Archer Daniels Midland (ADM) and Heritage seeds will outline current work on the research station and explain how this field work may lead into future production systems.

Program

- 9.00 – Welcome/Tea and coffee Neil MacDonald DPIR
- 9.20 – Department of Primary Industry and Resources diversification program Callen Thompson
- 9.50 – Soybean Market potential Damian Bradford ADM
- 10.20 – Tropical pasture seed production potential Brent Scott Heritage seeds
- 10.50 – Field walk
  - Burgundy Bean Arthur Salisbury Heritage Seeds
  - Soybeans Damian Bradford ADM/Callen Thompson DPIR
  - Cassava Ian Biggs DPIR
- 12.00 – Lunch

4 April 2017 starting 9.00am. Please RSVP to Teagan.Alexander@nt.gov.au

February 2016

Inside this issue:

Livestock disease investigations

The Department of Primary Industry and Resources (DPIR) provides a free disease investigation service to livestock owners for diagnosis of notifiable emergency, exotic and endemic disease, including zoonotic diseases. Berrimah Veterinary Laboratories provide free diagnostic testing for exclusion of notifiable disease for all disease investigations, and subsidies are available to private veterinarians for significant disease investigations in livestock.

During July–December 2016, 111 livestock disease investigations were conducted to rule out emergency diseases or investigate suspect notifiable diseases across the Northern Territory. Figure 1 shows the number of investigations by species of livestock.

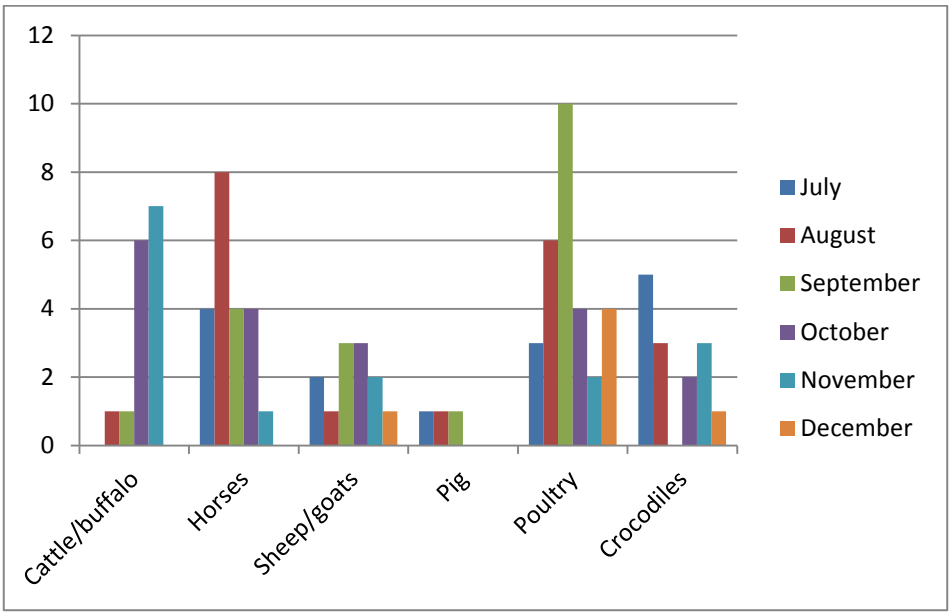


Figure 1. Livestock disease investigations by species for July - December 2016

Berrimah Veterinary Laboratories processed 271 livestock sample submissions, including samples to substantiate proof of disease freedom certifications, for accreditation programs and targeted surveillance to support market access.

The following case reports are a selection of field investigations of livestock disease incidents during the quarter.

Livestock disease investigation case reports

Bovine ephemeral fever causes mortality in cattle during dry season muster

Bovine ephemeral fever (BEF), also known as Three Day, is a disease found in cattle. BEF is spread by flying insects and is most commonly seen during the wet season in the Northern Territory. Cattle that have been exposed to the disease will usually build up immunity. Young cattle or cattle not previously exposed to BEF are more likely to be affected by the disease.

A manager on a flood plain property in Arnhem Land noticed approximately 30 head of two-year-old cattle from a mob of 450 showing signs of lameness, lack of coordination and lying down during the muster.

Samples taken from two of the affected animals by DPIR regional veterinarians showed no abnormalities. Although unseasonably early, laboratory tests on the blood samples taken detected BEF in blood samples from all animals sampled. Early rain resulting in increased insect activity likely contributed to illness and deaths in naïve cattle.

Sudden death and preputial swelling in steers caused by poor castration hygiene

Following castration, station staff noticed a dead steer and a further 12 steers were noticed to have massive swelling in the preputial area (in the front of the genital area). Despite swelling, all steers appeared to be moving and urinating normally.

Figure 2: Steers with swollen preputial area

An autopsy on one steer found no remarkable changes in the ureter and urethra. The greater omentum was found to be congested, inflamed and had migrated into the lower pelvic cavity. There was a hard mass in the prepuce (pizzle) which appeared to be a mass of dead tissue.

The poor hygiene at castration likely contributed to an opportunistic bacterial infection of the castration wound. The 12 steers were given antibiotic therapy, and all recovered rapidly.

Suppurative cholangiohepatitis in a steer

A station manager found an eight-month-old Brahman bull calf lying down, unable to stand and moderately dehydrated. The calf was without a fever, and appeared to be fairly bright.

Tests conducted on the live animal did not reveal significant internal parasites, persistent infection with pestivirus, or evidence of bovine ephemeral fever. Mild muscle damage was found, likely due to the calf being unable to stand. The calf received supportive care for a week without improvement and was then euthanised.

A DPIR regional veterinarian conducted an autopsy on the calf. The most notable of the samples taken was the enlarged haemorrhagic gall bladder containing thickened bile. It was also observed that the liver was enlarged. All other organs appeared to be normal. Laboratory tests found that a bacterial infection had ascended through the bile duct from the intestine through to the gall bladder and on to the portal areas of the liver. In the lab, the bacteria *E. coli* was grown from the samples collected from the liver, spleen and bile.

Figure 3: Enlarged and inflamed gall bladder

In this case, the final diagnosis was suppurative cholangiohepatitis, which is a blockage of the biliary ducts by bacteria which prevents a suppression of the flow of bile into the intestine.

Various conditions cause mortality in mixed age poultry flock

The sudden death of five chickens out of a flock of 60 was investigated by DPIR regional vets in the Darwin region.

A number of birds in the flock showed signs of sneezing, nasal discharge, swollen faces and ruffled feathers following the introduction of a new bird into the mixed age flock approximately one month previously.

Post mortem and laboratory investigations of the dead birds revealed a moderate to mixed gastrointestinal parasite burden in two juvenile chickens. One adult layer was found to have moderate to severe uveitis (eye inflammation), moderate keratitis (inflamed cornea), mild conjuctivitus and a concurrent yolk peritionitis was diagnosed. A lymphatic neoplasia affecting the lung, kidney, ovary and intestinal serosa was found in another adult layer hen, likely due to infection with lymphoid leucosis. Avian influenza and Newcastle disease virus were ruled out in all birds. Given the varied range of conditions in this case, DPIR veterinarians provided the owner with management and biosecurity advice, and the owner has not reported any further losses.

Lead toxicity in a dog

An eight-year-old dog was examined by a private veterinarian after it began having acute seizures, along with a rapid heart rate and hyperthermia. The dog failed to improve with treatment and was euthanased. The dog was sent to to Berrimah Veterinary Laboratories (BVL) for post-mortem.

The post-mortem showed that the dog was in good condition. There was evidence of diarrhoea, along with water and mucus mixed with small stones and plant material. BVL staff examined a wide range of tissues, including the brain; however, no significant findings were made.

Further discussion with the dog owner revealed that two other dogs had showed similar symptoms and died over the previous couple of months. The owners reported that the dogs had access to an area on the property where people had been making lead sinkers by the smelting of old car batteries.

Toxicology results showed that the liver had a markedly elevated level of lead (110 µmol/kg wet wt., ref <2 µmol/kg), confirming a diagnosis of lead toxicity in the dog.

Pregnancy toxaemia the cause of sudden death in mustered cattle

Department of Primary Industry and Resources veterinary officers received a call regarding sudden deaths in a mob of 50 previously unhandled Brahman cross cattle that had been mustered by a helicopter. Staff held the cattle for a time before trucking them to the station yards for processing. Several of the heifers displayed signs of panting, agitation and varying degrees of lameness and lack of control over body movements. Three heifers died over the following two days.

Post-mortem examination revealed that one of the heifers was approximately 30 months old, in moderate to poor body condition. There was extensive carcase bruising and bones were unusually brittle, the liver was diffusely pale, gall bladder enlarged and the omasum was dry and hard. The heifer was approximately seven months pregnant with a bull calf.

Laboratory tests showed that the heifer had elevated muscle enzymes and raised ketone levels and a diagnosis of pregnancy toxaemia was made.

Pregnancy toxaemia, or fatty liver disease, occurs when the body begins breaking down fat for energy and produces ketones. A build-up of ketones in the bloodstream is toxic to the brain, which is fatal and difficult to treat once it has progressed. Post-mortem will often show a characteristic enlarged, soft, pale yellow liver and a later-term pregnancy.

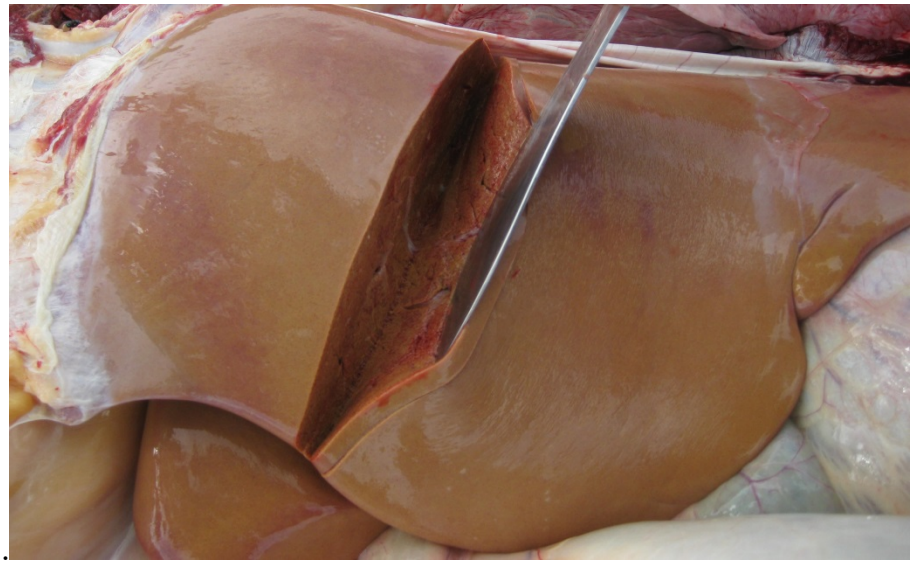


Figure 4: Characteristic soft, pale yellow liver in a cow with pregnancy toxaemia

Pregnancy toxaemia occurs most commonly in fat pregnant cows when feed is limited or of poor quality. Stress, such as transport and yarding and time off feed and water, can also induce the disease, and a number of cows can be affected at the same time. While it can be difficult to identify late-pregnant cattle in a muster situation, stress should be minimised where possible and good quality feed should be available at the destination. When trucking cattle in late pregnancy, avoid transporting cattle which are due to calve within four weeks (unless the journey is less than four hours and directly to another property), and minimise time off water.

Australian bat lyssavirus exclusion in a dog

A one-year-old crossbred dog was taken to a private veterinarian after the owners noticed it had been fitting and acting unusually for the past day. The veterinarian found that the dog was hyper-sensitive to light and movement, had stiff limbs and a head tilt. Differential diagnoses included tetanus and rabies. The dog was euthanised after it failed to improve with treatment.

Post-mortem examination found the dog was underweight and dehydrated, with pale gums.

Laboratory testing showed there was mild inflammation of the brain. There was also inflammation of the lungs and the tissue of the paw pads, which suggests the dog may have inhaled or had contact with of some kind of irritant. Severe bleeding in the gastrointestinal tract may have been due to a blood clotting disorder.

A number of tests were conducted at the Australian Animal Health Laboratories and Australian bat lyssavirus, rabies and morbillivirus (canine distemper) were excluded. Tests were also run to check for lead,

metaldehyde and snake venom levels, but levels did not provide a diagnosis. The signs seen in this dog are consistent with exposure to a toxin which could not be confirmed.

Nervous signs in a bovine viral diarrhoea virus persistently infected steer

A producer called Department of Primary Industry and Resources field veterinary officers to have a look at a three-year-old Brahman cross steer on a property just out of Darwin. The steer was apprehensive of people and extremely sensitive to noise and contact. The steer was in a mob of 100 cattle that were not exhibiting any of the same behaviour. The manager of the property also mentioned that the steer was significantly stunted compared with other steers on the property that were of similar age. The steer was euthanised and submitted as a transmissible spongiform encephalopathy (TSE) exclusion case to Berrimah Veterinary Laboratories.

Post-mortem examination found no abnormalities other than the spleen being smaller than expected. Tests proved that the steer was persistently infected with bovine pestivirus.

Bovine pestivirus is endemic in the Northern Territory and if a cow is infected while pregnant, the calf will also become infected. If the pregnancy is not aborted and the calf survives, it will shed the pestivirus for life (which is why they are known as persistently infected or 'PI'). PI cattle can grow well, but are generally unthrifty with a rough coat compared to other cattle the same age. They are a source of infection for other cattle which have not been exposed to the virus. PIs usually have a reduced life expectancy.

Sudden death in a mixed poultry flock

A hobby farm reported the sudden death of 11 birds from a free range mixed poultry flock of 15 birds outside Darwin. There had been no recent management changes or introduction of new birds.

Eight chicken, duck and guinea fowl carcases of mixed ages and sexes were found in varying degrees of decomposition and covered with maggots. Post-mortem examination showed all birds were in good condition, and four had maggots present in the upper gastrointestinal tract. Internal parasites were found in the faeces and there was no histological evidence of systemic infectious disease. Newcastle disease and avian influenza were excluded in all of the birds and the maggots were not those of the screw worm fly.

Warm, humid weather and rotting vegetable matter favour the grown of the *Clostridium botulinum* toxin in maggots. The presence of ingested maggots in the birds in this case is highly suggestive of botulism as the cause of disease. Cases of botulism in poultry occur annually during the wet season in the northern part of the Northern Territory. Poultry owners should prevent birds from having access to possible sources of the toxin by removing decaying food scraps, animal carcases and rotting vegetation.

Toxic algal blooms

When a body of water becomes discoloured with a super abundance of free-floating, microscopic plant or, in rare cases, animal life, it is said to develop a 'water bloom' or algal bloom. Algae are primitive plants and include seaweeds, fine hair-like green forms and microscopic single cells or colonies. Some of the microscopic species are the most dangerous and can multiply rapidly to produce prominent green, red, yellow and other discolouration of water. A group of algae known as blue-green algae produces the most

spectacular blooms in fresh water dams and several of these can produce toxins when conditions are favourable.

Livestock losses on stations in the Victoria River district of the Northern Territory have previously been associated with algal blooms.

Poisoning of livestock

Blue-green algae (cyanobacteria) blooms thrive in warm, calm, shallow bodies of water where the water is hard, alkaline, and rich in nitrogen, phosphates, carbonates, and organic matter. These algal blooms can pose a threat to livestock as poisoning can occur if they swallow the algae while drinking the contaminated water. Fish are often safe until a pond or dam dries or is drained, bringing them into contact with floating algae.

Poisonings attributed to blue-green algae usually occur in the dry season. Runoff from arable land and animal droppings greatly increase the likelihood of algal blooms ponds or lakes.

Blooms of the blue-green alga *Nodularia spumigena* form a scum on sheltered shorelines when concentrated by winds or currents and can form a suspension in the water. The blue-green algae species most commonly associated with the deaths of livestock, waterfowl and fish are *Microcystis aeruginosa* and *Anabaena circinalis*. *Anabaena* and *Nodularia* have been implicated in skin and eye irritations in people and dogs, while *Microcystis*, *Anacystis*, and another less commonly encountered alga, *Lyngbya*, have been reported to cause hay fever symptoms.

Symptoms of poisoning

The most common sign is finding a dead animal near affected water. In some cases, the forelimbs, lips and muzzle of the animal will show traces of algal scum.

Post-mortem examination will sometimes reveal bleeding from the tiny blood vessels under the skin and between the muscles. However, it can be difficult to make a confident diagnosis of algal poisoning, since the clinical signs and post-mortem findings can resemble a variety of diseases.

If stock must be moved to another paddock, do it at a very easy pace.

Identification of algae

Once livestock have been moved, seek veterinary advice to confirm the diagnosis and send a sample of the bloom for identification to the Berrimah Veterinary Laboratories where it will be viewed under high magnification to identify the algae.

Algae submitted for identification should preferably be fresh and healthy and the water sample is to be submitted in a small (100 millilitre) screw-topped jar fresh, or, if possible, with sufficient formalin added to make up a three per cent solution.

Treatment and prevention of contamination of farm water supplies by algal blooms

Station water supplies

Algae in water tanks may be controlled by covering the tank to exclude light and reduce the temperature.

Deep dams are better than shallow dams as they reduce algal use of the sun's energy. The nutrient levels in station dams may be reduced by screening systems. These screening systems reduce fouling of dam water by stock excreta and plant debris, and ensure the restriction of fertilisers in the immediate catchment area. The screens also ensure that the size of the catchment area is large enough to cater for sufficient runoff to cause an overflow in most seasons.

Chemical control

Dosing dams with alum and gypsum has proven to be an effective means of removing phosphorus from the water. As the phosphorus is the most important nutrient for blue-green algae, the removal of this can prevent the algae from forming. For the best results, dams should be dosed prior to the formation of the bloom. If the dam is dosed after the bloom has started to form, stock should be excluded from the water source for five days as algae are at their most toxic as they are dying off.

It is recommended that the alum and gypsum should be applied at a rate of 50 kilograms of alum and 50 kilograms of gypsum per megalitre of water. The alum crystals are to be added first and should be mixed in to the water. The water should be left to stand for a few hours prior to adding gypsum. Once the gypsum has been added, let the water stand for at least 24 hours, or until clear. If the water has not cleared in two to three days, add an additional 25-30 per cent of the recommended dosage of the alum and gypsum.

A preliminary trial can be conducted by filling a 44-gallon drum with the dam water to ensure that the dosage is correct. Once the dam has been dosed and becomes clear, a pool pH test kit can be used to ensure that the pH is between six and nine. If the pH is not in the right range, allow the water to stand two days and check again.

Please note that older algal treatments are not environmentally friendly and should not be used.

Reference:

New South Wales Department of Primary Industries 2013, viewed 21 December 2016, <http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0006/103785/Managing-blue-green-algae-in-farm-dams.pdf>.

Figure 5: Cattle in dam containing algal bloom

Livestock movement and identification in the Northern Territory

Regulation of livestock identification and movements is an essential component of any disease control system. The *livestock Act and Regulations* is the legislation that regulates livestock identification and movements in the Northern Territory. Livestock Transport Standards (LTS) is administered by the Department of Primary Industry and Resources (DPIR). Failure to comply with the NT Livestock Act and Regulations could result in penalties which may include an infringement notice being issued or prosecution.

Animals defined under the *Livestock Act as* 'identifiable livestock' are:
Alpacas, llamas, bison, buffalo, cattle, camels, deer, emus, ostriches, goats, horses, mules, donkeys, pigs, poultry, pigeons and sheep.

Under the *Livestock Act* and *Regulations*, livestock owners are required to comply with the following identification and movement requirements to support market access and traceability in the case of an animal disease or chemical residue incident:

Property Identification Code (PIC)

All parcels of land in the NT that have identifiable livestock are required to register for a PIC with the Department.

More information on PICs is at .
https://www.nt.gov.au/industry/agriculture/livestock/get-a-property-identification-code

NT PICs can be searched at http://pic.primaryindustry.nt.gov.au.

Brands

Under the NT *Livestock Act a* NT registered brand is required on all cattle over eight months of age. The brand is required to be legible and in the correct position as stated on the registered brand certificate.
It is an offence to apply an earmark to a cow unless the animal has a legible brand applied.

NT Brands can be searched at http://brand.primaryindustry.nt.gov.au/

Brand/earmark application forms and further information on brands is at
https://nt.gov.au/industry/agriculture/livestock/brand-and-identify-livestock/livestock-brands-in-nt

National Livestock Identification System (NLIS)

The NLIS system in Australia was introduced by Industry and enacted in state and territory legislation. It commenced in the NT on 1 July 2007 and is Australia's system for identifying and tracing livestock for food safety, product integrity and market access purposes.

In the NT, all cattle and buffalo must have an approved NLIS device attached to their right ear before they are moved off a property, regardless of where they are going. All sheep and goats must have an approved transaction tag for any movement off a property.

Identification before movement

The owner of the property must ensure all livestock moving off the property have an NLIS device attached to the off side (right) ear before the livestock movement begins.

Reporting requirements for the owner of the property of destination

The owner of the property of destination must ensure that the NLIS information is entered on the NLIS database within 48 hours after the movement is completed.
The NLIS database stores all cattle and buffalo movements.

Further information is at https://nt.gov.au/industry/agriculture/livestock/brand-and-identify-livestock/nlis-in-the-nt

Botulism in the Northern Territory

Botulism still causes significant stock losses in the NT despite the rigorous vaccination programs adhered to by most cattle stations.

2015 botulism survey results

In 2015 a survey was carried out on 19 properties in the Northern Territory to determine what percent of protective antibodies there were in the cattle after vaccination. A study by Kelly and Fordyce (2014), '*Analysis of serological responses by cattle against C. botulinum following vaccination*', confirmed that a blood antibody level greater than 0.45 was protective against a challenge of botulinum toxin. Using this parameter of 0.45 serological ELISA units as the acceptable vaccination standard affording protection, it was found that the range of protection in animals measured in the 19 vaccinated herds varied from 0% to 100% with an average of only 67% of the animals being covered. This means that over 30% of the supposedly vaccinated animals failed to have a protective titre against botulism.

Some contributing factors that could prevent adequate protective antibody levels after a vaccination program are:

- stress factors imposed on the animal at vaccination
- poor vaccination procedures
- inadequate attention to the 'cold chain' process
- the choice of vaccine
- cattle missed in mustering
- lack of vaccine boosters
- concurrent diseases, such as pestivirus
- poor nutritional status of the animals
- concurrent high parasitic challenges
- stock being vaccinated too young (antibodies transferred from the cow, called maternal antibodies, can interfere with vaccination).

One station in the Northern Territory saw a significant improvement from 82%-100% (the best overall result recorded in the trial) by taking precautions in the following areas:

- improving the cold chain process
- taking time in the vaccination process with a few checks and balances incorporated. See a short video on the correct storage and use of vaccines at **http://www.youtube.com/watch?v=sDuZ5-e6bxI** or see Jodie's article on page 1.
- ensuring less stress all round in stock handling.

Cause of botulism

Botulism in cattle is caused by two toxins, C and D, which are produced by the bacterium *Clostridium botulinum*. All warm-blooded animals can be affected by one or more of the seven toxins produced by this gram-positive anaerobic bacterium.

Cattle that have not been vaccinated, and have not been supplemented with phosphorus and protein will seek out and chew bones and decaying carcases. These are the most common sources of contamination. Although both male and female cattle are equally susceptible to the toxin, botulism is more commonly seen in breeding cattle. This is because breeders generally experience larger demands for phosphorus and protein in their diet due to lactation stress.

Clinical symptoms

In botulism, normal nervous function is interfered with resulting in an ascending paralysis, and cattle are one of the most susceptible species. The first observed signs may be depression, muscular weakness and incoordination. The incoordination will usually begin in the hind legs, making the beast stumble and knuckle over and go down. Once down, the animal appears very weak and has great difficulty in rising. Paralysis of the tongue and throat is often seen, causing the animal to refuse to drink, resulting in dehydration. This paralysis eventually affects the muscles involved in breathing, causing respiratory failure. Semicircular marks on the ground resulting from the uncontrolled paddling movement of the legs can sometimes be observed around the carcase.

Diagnosis

The diagnosis of botulism is largely based on clinical signs suggestive of the disease as there are no laboratory tests of any value. These clinical signs can vary dramatically depending on the amount of toxin ingested and any pre-existing immunity the animals might have.

In an affected animal the tongue is usually unable to be retracted and the animal may drop cud and drool saliva, however this can also occur in animals with three day sickness and other disease. Bones or maggots may be found in the reticulum and indicate bone chewing or 'pica'. The omasum is usually hard, enlarged and dry ('dry bible') due to dehydration.

Often the field diagnosis of botulism as the cause of animal losses has been met with some scepticism especially when there is a fairly rigid vaccination program in place. The extent to which

the vaccination programs were providing a protective level of antibodies against the disease was not known, however.

Treatment

There is no treatment for the affected cattle. Vaccination is not effective for cattle once the animals are showing signs of having botulism as it takes more than five weeks after vaccination to produce protective antibodies.

Prevention - THREE MUST DOs

1. Vaccination at weaning and then giving the boosters every year or three years as recommended.
2. Supplementary feeding with phosphorus and protein.
3. Removal of all carcases and bones–this will limit bone chewing.

Figure 6: Animal showing signs of botulism

Pastoral Market Update

DEPARTMENT OF PRIMARY INDUSTRY AND RESOURCES

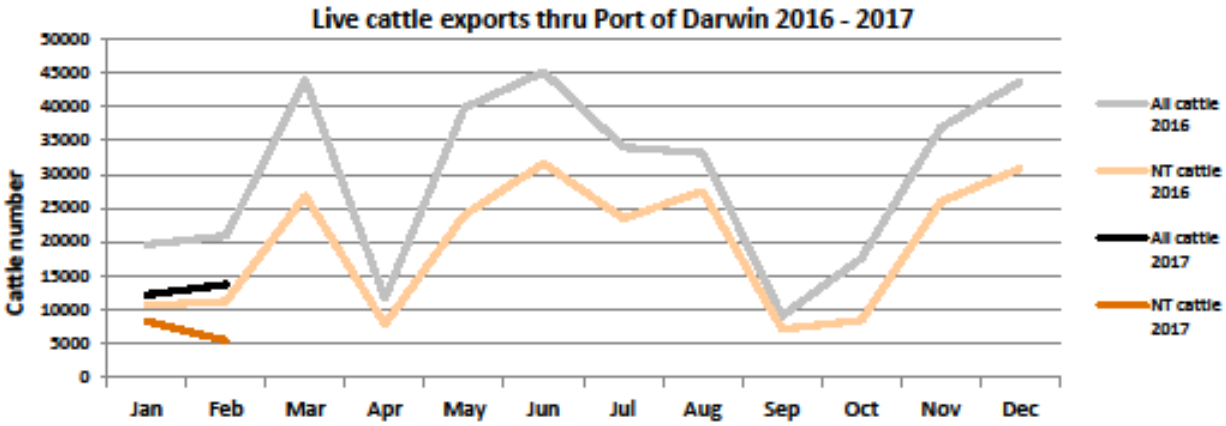
Live Cattle Exports via Darwin Port – FEBRUARY 2017

Please note: figures are for cattle exported through the Port of Darwin only; some NT cattle are exported through interstate ports.

Destination	Export of ALL CATTLE (including interstate) from Darwin Port							Export of NT CATTLE from Darwin Port (estimate only)						
	2015	2016	Last year to 29/02/16	YTD to 28/02/17	FEB	Last month	Difference	2015	2016	Last year to 29/02/16	YTD to 28/02/17	FEB	Last month	Difference
Brunei	4,122	3,379	0	0	0	0	0	2,069	2,314	0	0	0	0	0
Indonesia	341,759	296,230	36,760	24,622	13,555	11,067	2,488	197,155	195,087	19,850	12,932	5,395	7,537	-2,142
Philippines	23,611	4,697	0	0	0	0	0	13,559	3,236	0	0	0	0	0
Sabah	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sarawak	300	1,220	0	0	0	0	0	0	843	0	0	0	0	0
Malaysia	11,503	10,959	0	0	0	0	0	7,499	7,476	0	0	0	0	0
Vietnam	100,119	36,405	3,785	1,324	197	1,127	-930	63,998	24,783	2,044	846	78	767	-689
Egypt	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thailand	6,154	0	0	0	0	0	0	3,610	0	0	0	0	0	0
Cambodia	0	2,766	0	0	0	0	0	0	1,936	0	0	0	0	0
TOTAL	487,568	355,656	40545	25946	13,752	12,194	1,558	287,892	235,625	21,894	13,777	5,473	8,304	-2,831

February at a glance

- 13,752 cattle through the Darwin Port during February; 1,558 more than last month and 7,163 less than in February last year.
- 5,473 NT cattle through the Darwin Port during February; 2,831 less than last month and 5,821 less than in February last year.



OTHER LIVESTOCK EXPORTS VIA DARWIN PORT

Includes NT and interstate stock.

Destination	Buffalo		Goat		Camel	
	YTD	FEB	YTD	FEB	YTD	FEB
Brunei	0	0	0	0	0	0
Indonesia	195	195	0	0	0	0
Philippines	0	0	0	0	0	0
Sabah	0	0	0	0	0	0
Sarawak	0	0	0	0	0	0
Malaysia	0	0	0	0	0	0
Vietnam	479	400	0	0	0	0
Egypt	0	0	0	0	0	0
Thailand	0	0	0	0	0	0
Cambodia	0	0	0	0	0	0
TOTAL	674	595	0	0	0	0

NT CATTLE MOVED INTERSTATE

Destination	FEB
NSW	648
QLD	951
SA	448
VIC	200
WA	70
Total	2,317

NATIONAL CATTLE PRICES

www.mla.com.au/prices-and-markets

CURRENCY EXCHANGE RATES

www.oanda.com/currency/converter

Total Cattle, Port of Darwin							
2009	2010	2011	2012	2013	2014	2015	2016
647,514	295,605	269,617	246,990	559,616	498,958	487,568	555,656

NT Cattle, Port of Darwin							
2009	2010	2011	2012	2013	2014	2015	2016
504,818	272,749	258,797	254,249	508,784	524,477	287,892	255,625

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Katherine region events calendar

Event	Location	Date	
Climate in the top end CSIRO	Katherine Research Station	7 April 2017	Eva.Zinkousky@csiro.au
Spray technology workshops	Douglas Daly Katherine Alice Springs	August 2017	Callen.thompson@nt.gov.au
KRS Field Walk	Katherine	4 April 2017 9am	Callen.thompson@nt.gov.au
Roper River Landcare Group Meeting	Mountain Valley Station	11 April 2017 9.30am	roperlc@bigpond.net.au

Please email us with updates of events happening in your area: callen.thompson@nt.gov.au

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