

Top Paddock

DEPARTMENT OF PRIMARY INDUSTRY AND RESOURCES



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Figure 1. Tree damage from cyclone Marcus

Message from the editor

Welcome back to another year. I hope the damage from Cyclone Marcus was minimal for your property. Like most of Darwin we lost a few large trees out at Berrimah Farm, along with some other damage. I expect the clean-up will continue for a while yet.

We have some interesting articles in this edition, including work on native bees as pollinators by our entomology team, as well as some pastures and forestry work.

I'll let you get back to it

Cheers

Ed



Figure 2. Native stingless bees flying to their hive.

The buzz about stingless bees: sweating it out in tropical fruits

Horticulturalist Mark Traynor and Entomologist Mary Finlay-Doney have begun farming native stingless bees in a pilot study to improve fruit production in Northern Territory tropical fruit crops.

Native stingless bees (*Tetragonula* spp.) are abundant in Top End environments. Locally they are also known as sugar bag or sweat bees and they can regularly be found nesting in wall cavities and upturned containers as well as trees and termite mounds. The bees themselves are smaller than a house fly and unlike European honey bees their buzz is barely audible.

The stingless characteristic, along with the fact that they are a local species adapted to local conditions makes them an ideal potential candidate for managed pollination. To date, stingless bee keeping in the Northern Territory has focused on sustainable management of natural resources and backyard keepers with a small number of hives. At Berrimah Farm Mark and Mary have established a small apiary of a dozen hives which they are planning to propagate over the coming year.



Figure 3. DPIR staff removing a native stingless bee hive from a brick wall.

“We are collecting hives from structures around the farm which will be knocked down during the [Northcrest] development” Mark says. These ‘rescued’ bees form the basis of an apiary which will be used to develop hive management practices specific to the local species *Tetragonula mellipes*. Historically stingless bee research in Australia has focused on *Tetragonula carbonaria*, a species which is restricted to the east coast. At Berrimah Farm, the researchers are testing various hive structures and designs as well as recording ecological data about natural hives to get a picture of what local bees

require to flourish. “Already we are finding that accepted wisdom for east coast stingless bee species does not hold true for our local *mellipes*,” Mark says.

Preliminary behavioural observations have shown that the bees begin flying at first light and make the majority of their pollen collections before midday. “This year we will complement these behavioural studies with an investigation into the flowering phenology of rambutans,” says Mary. “We hope to identify if the bees are actively foraging when the flowers are receptive to pollination. Each piece of information we gather contributes to our understanding of these bees and their potential use as managed pollinators”.

Plans for this year include field observations on grower’s properties and an open day at the rambutan block at Coastal Plains Research Farm. The open day will include a demonstration of hive designs and apiculture practices and, if the hives are thriving, possibly even some honey tasting.

For more information about native bees as pollinators, contact Mary Finlay-Doney on 8999 2260. For information about European Honey Bees and beekeeping visit our [website](#).



Figure 4. Native stingless bee collecting nectar from a Grevillea flower.

Research progress of resin canal disorder in NT mangoes

Umar Muhammad

PhD candidate Umar Muhammad is researching resin canal disorder in mangoes with the Australian Research Council Training Centre for Innovative Horticultural Products, located at the Tasmanian Institute of Agriculture at the University of Tasmania.

Resin canal disorder (RCD) is a fruit quality defect found in Australian mangoes. It occurs sporadically and



Figure 5. Resin canal in mangoes.

shows up as red-brown resin canals that form networks through the flesh and irregular brown mottling across the skin. RCD is most common in ‘Kensington Pride’ mangoes. Other than the visual appearance, RCD does not affect the eating quality and the defect only becomes evident when fruit are fully ripe. In some cases, RCD symptoms may only become visible after purchase. The causes of RCD are still unknown and it is sometimes confused with other skin browning disorders.

Umar spent a short period of time at the Department of Primary Industry and Resources Berrimah Agricultural Laboratory in Darwin in collaboration with Dr Cameron McConchie and Dr Lucy Tran-Nguyen in the 2017 harvest season. During his placement, Umar had the opportunity to sample a range of mango material (fruit, stem and leaves) from different commercial orchards around Darwin. Umar’s research will

include using new molecular techniques such as Next-Generation Sequencing and metagenomics to investigate differences in microbial community structures in RCD infected mango fruits in relation to provenance (farm location and farm history).

In the final stages of his 2017 research trials, Umar tested pre and post-harvest intervention options that may help to manage RCD. He experimented with non-destructive near-infrared techniques and modified atmospheric packaging to investigate the incidences of RCD under different storage conditions in mature fruit.

Umar is still processing the data he collected during the recent Northern Territory mango harvest and he is hoping the research will help to further develop management strategies to address RCD in mangoes. Umar is currently considering how his pre-harvest research trials and development of post-harvest interventions may be applied in the 2018 Northern Territory mango season.



Figure 6. Mango resin canal disorder studies in the NT: checking NIR of fruit (left), testing leaf samples (middle), post-harvest assessments (right).

AgriFutures NT Rural Women's Award 2018

The AgriFutures™ Rural Women's Award is Australia's leading award acknowledging and supporting the essential role women play in rural industries, businesses and communities. DPIR would like to congratulate the 2018 Northern Territory Rural Women's Award winner Linda Blackwood and finalists Amber Driver and Annette Howie. All three of the inspiring finalists identified important areas for development in NT regional, remote and rural communities.

Linda Blackwood won the award for a Station Site Access accreditation project that would reduce risk and increase efficiency for remote stations hiring contractors. The Award provides a platform to inspire and support Australian women to use and develop their skills to benefit their industries and communities. Linda received a \$10,000 bursary to support the project, and will represent the Northern Territory (NT) at the national awards ceremony in September.

Amber Driver identified challenges faced by rural women living in the NT as a key focus area. She proposed a number of workshops to equip women with the tools to generate positive pathways for self-prosperity, resilience, success and to encourage them to take on new roles to serve both the rural sector and the community.

Annette Howie established Country Connections NT, a network that provides rural, regional and remote women across the Territory with links to support services, community groups, government and private enterprise. She is working to further develop the project onto digital platforms that connect and inform.

The \$10 000 bursary is awarded to each state/territory winner, providing the financial resources to bring to life a project or initiative that will benefit rural industries, businesses and/or communities. The national winner will be awarded an additional \$10,000 bursary and national runner up, an additional \$5,000.

Visit the AgriFutures™ Australia [website](#) for more information.

In brief: Horticulture code of conduct comes into effect on April 1st

The 2017 mandatory Horticulture Code of Conduct, becomes compulsory from April 1st 2018. The code is Commonwealth legislation covering horticultural produce including all unprocessed edibles; but not nursery, ornamental or cut flowers.

This code regulates transactions so that everything is in writing up front between growers and traders (where traders include agents or merchants). It also includes an avenue of dispute mediation that is cheaper & easier than going through the courts.

All growers and traders will need a signed HPA (Horticultural Produce Agreement) before they can buy, sell or trade fruit from 1 April 2018, there are penalties (fines) for non-compliance. The new code specifies record keeping requirements, allows the Australian Competition and Consumer Commission (ACCC) to carry out investigations and compliance checks, lists the points that must be included in HPA's and provides a default list of Class 1 specifications called Fresh Specs (the default can be changed by including your own specifications in the HPA). Visit the Fresh Specs [website](#) for details on fruit and vegetable specifications.

NT Farmers have a template HPA for their members to utilise if they wish, contact Aisla Connolly
E: wpc@ntfarmers.org.au; T: (08) 8983 3233; M: 0400 416 558; W: www.ntfarmers.org.au.

For more information on the Horticulture Code of Conduct visit the ACCC [website](#) .

Strong biosecurity the priority at Rum Jungle Organics

Conor Doherty



Figure 7. Rum Jungle Organics celebrating at the Australian Biosecurity Awards. Photo courtesy of Steve Keough Photography.

Comprehensive biosecurity measures implemented following the outbreak of banana freckle in 2013 have paid off for Batchelor fruit farm Rum Jungle Organics. Rum Jungle Organics was named 2018 Farm Biosecurity Producer of the Year at the National Biosecurity Awards in Canberra on 6 March.

The Department of Primary Industry and Resources Plant Biosecurity Division nominated Rum Jungle in recognition of the extraordinary lengths they had taken to implement the strongest possible biosecurity practices on their property.

Chief Plant Health Officer Sarah Corcoran said the owners, Alan Petersen and Julie-Ann Murphy, had implemented some of the most comprehensive biosecurity measures in the region including having only one entry and exit point to the property, restricting all vehicular travel on the property to a farm dedicated vehicle, isolating new plants from the rest of the crop and carefully monitoring them, and maintaining visitor records in case future investigation is required.

“They treat their biosecurity plan as a living document, reviewing and updating it as necessary to minimise the risk of endemic and exotic pests and diseases getting onto their property,” Ms Corcoran said. “The biosecurity measures they’ve put in place not only protect their own livelihood from pest and disease, but also the broader industry, which enhances the reputation of the Territory and Australia as producers of fresh, high quality produce.

Rum Jungle Organics owner Julie-Anne Murphy said they have always made on-farm biosecurity a priority as they are an organic farm. “We farm regeneratively with an emphasis on plant and soil health and a dynamic biosecurity plan to minimize risks,” Ms Murphy said.

“During the Banana Freckle eradication we worked closely with the DPIR and built very strong working relationships with the National Banana Freckle Eradication Program within the department’s Plant Biosecurity Branch and we thank them for their support and nomination.

“We are very proud to represent both organic farming and the NT and hope our award will place the spotlight on the importance of on-farm, regional and national biosecurity, and regenerative organic farming.”

Dr Rosie Godwin, Research and Development Manager Australian Banana Growers Council (ABGC), visited Rum Jungle Organics while in Darwin recently and was impressed by the biosecurity measures implemented to minimise endemic and exotic pest incursions. “Exclusion as the first line of defence and implementation of effective on-farm biosecurity measures are key to keeping your farm free of pests and diseases,” Dr Godwin said.

Dr Godwin was given a copy of the comprehensive biosecurity plan Rum Jungle Organics has implemented to use as a guide to what other property owners can consider to minimise possible risks. Dr Godwin also shared information with Alan and Julie-Ann about how ABGC can assist banana growers.

Spotlight on Technology: Smartphone apps for farmers booklet

The widespread use of Smartphones has seen the development of a plethora of different Apps that are useful or relevant to farming. There are now so many apps that it can be a little overwhelming for people to try to navigate and find those that will work best for their situation. The Ag Excellence Alliance Inc. have developed a booklet to provide farmers with information about what apps are available and how the use of these could benefit them. This publication has downloaded and road tested a number of apps that might be beneficial to growers in order to provide information on suitable apps.



“Smartphone Apps for Smart Farmers v2” can be downloaded from the [Ag Excellence website](#).

Nucal seed production demonstration



Figure 8. Nucal “Panic” planting at Coastal Plains Research Farm

Arthur Cameron, Principal Pastures Agronomist, Darwin

Nucal Panic (*Panicum* sp) was the highest yielding of eight grasses in the recently completed Cool season grass trial at Coastal Plains Research Station (CPRS). Nucal has potential as an option for hay production during the wet and dry seasons, commercial seed production, year round grazing and dry season grazing under irrigation. We would like to sow Nucal under the grazed irrigated *Leucaena* at Douglas Daly Research Farm (DDRF) to replace the Jarra which has low cool season growth and production.

Although commercial seed production and seed availability is currently limited, we have planted a seed production demonstration at DDRF. Our goals are to measure seed production, demonstrate seed production for potential seed growers, to provide seed for sowing with the irrigated *Leucaena* at DDRF, and to provide seed for DPIR trials and demonstration sowings.

Method

An area of half a hectare on the Blain soil in the Irrigation Paddock at DDRF was irrigated, ploughed and sprayed to control weeds.

Ben Beumer and I dug up tussocks from the Cool season grass trial area at CPRS on 13 and 14 November 2017 with a disc plough to use as planting material. The tussocks were bare rooted and washed clean before being transported to DDRF. On the afternoon of 14 November, the tussocks were divided into sets of up to six tillers. We planted 500 square metres in 1m rows on the morning of 15 November using a twin disc vegetative planter borrowed from Finnis River Station. We were assisted by Ben Pickvance from DDRF. This area was irrigated immediately after planting, and fertilised on 4 December.

Some of the sets did not survive, mainly smaller sets with less than 4 tillers. We dug up more planting material from CPRS using a mattock on 12 December. It was divided into sets with four or more tillers and

planted later that day at DDRF to fill in gaps in the rows, with assistance from Peter Shotton from DDRF. Peter has since collected more planting material and expanded the plot.

The plot has been regularly monitored. Seed harvest is expected to be in early to mid-April 2018. The seed will be harvested using the Pastures Brush harvester, which has been relocated to DDRF. This seed production area can be expanded, either vegetatively, or using seed in future years, if required.

If you are interested in the Nucal plot or information on growing in, drop Arthur a line on 8999 2214.



Save the date!
Beatrice Hill field day
15th June 2018.

More details closer to the date.

Contact: Arthur Cameron
Ph: 08 8999 2214
arthur.cameron@nt.gov.au



Save the Date: Beatrice Hill field day

June 15 2018

Discussions will cover pastures and cattle research, more details will be provided closer to the date.



Figure 9. Mid-rotation thinning trials are established with harvest machinery

Economic diversification through innovative forestry

Dallas Anson

The largest area of plantation grown African mahogany (*Khaya senegalensis*) in the world is located in the Douglas-Daly region of the Northern Territory, with the total estate covering around 14,000 ha. The optimal resource inputs and management systems (silviculture) for plantation grown mahogany are relatively unknown and a research project initiated by the mahogany industry aims to understand the impact of silviculture on productivity and wood quality.

The project is jointly funded by the commercial mahogany industry and the Australian Government through the Voluntary Matching program which is managed by Forest and Wood Products Australia (FWPA). The industry has drawn on the expertise of John McGrath, of McGrath Forestry Services, to develop the study to understand the role of silviculture and optimize the productivity and wood quality in this emerging plantation timber resource. Northern Territory Department of Primary Resources and Industry and the Queensland Government are partners in this research.

The project is more than one year in and has established a range of trials focused on the impact of silvicultural inputs; fertilising, thinning and pruning, to understand the impact of changes in management on tree growth. Recently the work has been focused on determining optimum thinning and fertiliser regimes for a range of site conditions (driven by variation in soil and climate).



Figure 10. African mahogany plantation in late December 2017

Over the last year, I have been working in the field in this forestry industry research project, including making pre-dawn and midday measurements of leaf water potential using a Scholander pressure chamber in the field and sampling and processing leaves and soils back in the Berrimah DPIR laboratory. The measurements have provided information about water use by the mahogany trees and how tree productivity varies between sites and over time. The initial results have demonstrated strong differences in productivity between sites and that these differences are related to the availability of water. I've recently acquired my chainsaw ticket and look forward to using these skills in the project.



Figure 11. Dallas Anson (L) and John McGrath (R) measure midday leaf water status of mahogany in the 'back of the ute field lab', Douglas Daly. (Note the thin tree crowns in the plantation at the end of the dry season due to the seasonal shedding of leaves as the trees become water stressed)

Our future focus on refining the silviculture systems and practices for the emerging mahogany resources in northern Australia will optimise the value from these plantations.

Generating new varieties of ornamental Curcumas

Doris Marcsik

From the previous Rural Industries Research and Development Cooperation research project a selection of hybrids derived from the Department's curcuma germplasm, were identified by the nursery industry with having desirable attributes for production as a potted plant. This has led to strong interest from the nursery industry to further commercialise some of these curcuma hybrids. New varieties is another aspect that the nursery industry is strongly interested in. However, with the current curcuma germplasm this is difficult as most of the hybrids are sterile.

The use of mutagenesis is being investigated by DPIR as a method to generate new sources of genetic variations in creating promising new varieties of Curcumas. A preliminary trial using the mutation technique of gamma irradiation was undertaken on three curcuma hybrids.

To determine the effect of gamma irradiation on these curcuma hybrids prepared rhizomes were sent to the Australian Nuclear Science and Technology Organisation (ANSTO) facility to quantify optimum doses of gamma irradiation. Treated rhizomes were potted up and assessed for survival rate (lethal dosage LD₅₀), and examined for variations in plant morphology in response to the irradiation.

The main changes in plant morphology observed were leaf aberrations such as shape and chlorophyll mutations (Fig. 10). Irradiation induced some flower shape and flower colour variations in plants that survived the higher dose levels.

Further work will be conducted on looking at *in-vitro* mutagenesis using both physical and chemical mutagens. Selected curcuma hybrids are currently being multiplied in tissue culture for this work.



Figure 12. From left to right: Non-treated *Curcuma* inflorescence; a mutant inflorescence with darker pink-coloured bracts and lighter green basal bracts. Some plant morphological and leaf chlorophyll variations split leaves and strong variation in green colour intensity exhibited in the leaf, and (far right) narrow leaves with white longitudinal bands alternating with green colour.

In brief: Horticulture code of conduct transition ends

The horticulture code of conduct is a mandatory code legislated in the Competition and Consumer Act 2010. If you sell unprocessed fruit or vegetables, edible mushrooms, nuts, herbs and other edible plants (but excluding nursery products) through an agent or merchant, you're required to have a written contract. The contract details things like how price is calculated and when you get paid and includes fines and infringement notices for breaches of certain sections. The current code came into effect on 1 April 2017, and the 12-month transition period ended on 1 April 2018. For more information about the Code visit the [ACCC website](#). In brief: Recent Listeria incident in rockmelons from NSW farm.

In brief: Recent Listeria incident in rockmelons from NSW farm

There has been a great deal of public concern following the contamination of rockmelons from a farm in New South Wales with Listeria (bacterium called *Listeria monocytogenes*).

The NSW food authority is advising vulnerable and at-risk consumers to avoid rockmelon and the farm in question has recalled their fruit. As a result of the outbreak, there has been a significant decline reported in the sale of melons in general. Melons Australia have a page on their website addressing many of the concerns from growers and the general public. They are updating details frequently including potential grower meetings.

There is an NT Farmers meeting on Wednesday 11 April at Katherine Research Station where the issue will be discussed. For more information and to stay up to date on the industry response, visit the [Australian Melon Association website](#), or contact Dianne Fullelove from the Australian Melon Association.

E: mdp@melonsaustralia.org.au ph:0413 101 646 or visit the [NT Farmers website](#).

Do you keep chickens at home?

Then you need a Property Identification Code (PIC).

If you keep livestock on your block or in your backyard, you need to register for a Property Identification Code (PIC). A PIC is a free registration code that identifies the property where your livestock are kept.

Livestock includes cattle, buffalo, horses (inc. mules and donkeys), bison, pigs, poultry, pigeons, deer, llamas, alpacas, camels, emus and ostriches, sheep, goats and beehives.

Help keep your livestock safe in the event of a disease outbreak, bushfire or animal emergency, and register today. Registering for a PIC is easy and free, [register online](#).

For more information visit the [NT Government website](#), and click on 'Get a property identification code'.

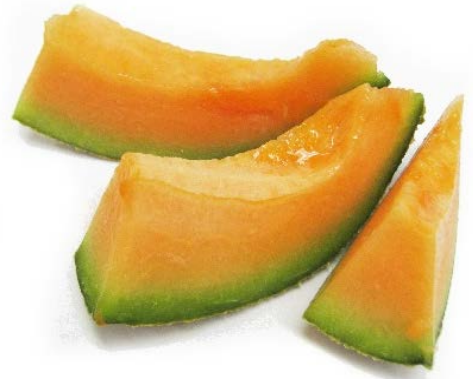


Figure 13. Sliced rockmelon fruit



Figure 14. Backyard chickens



*Save the date!
DPIR mango research update
May 2018.*

More details closer to the date.

*Contact: Chelsea Moore
Ph: 08 8999 2323
chelsea.moore@nt.gov.au*



Save the date – Mango R&D Forums

Mango growers, producers, consultants and agronomists in the horticulture sector are invited to two Mango Research and Development (R&D) Forums on Wednesday 9 May and Thursday 10 May.

The Department of Primary Industry and Resources (DPIR) and the Northern Territory Farmers Association (NTFA) will host the two forums – in Darwin and Thursday 10 May in Katherine – and invite your input to the future direction of our R&D.

These forums will benefit anyone involved in the mango industry and will discuss recent results with the researchers who are exploring mango production, including research on:

- nutrition and fruit quality
- precision technologies such as remote sensing, sensor technologies and machine learning
- magpie geese
- flowering and market chain research
- insect pests, IPM and chemical control
- export activities.

DPIR and NTFA will be introducing our new mango extension staff who will work to build this capacity. Representatives from the Australian Mango Industry Association and Hort Innovation will be attending to discuss the new mango industry RD&E project to build capacity in the Australian mango industry.

The locations and times of the two forums are still being confirmed, but further details will be shared when they become available.

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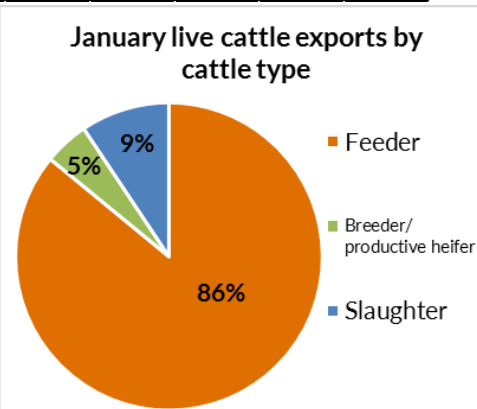
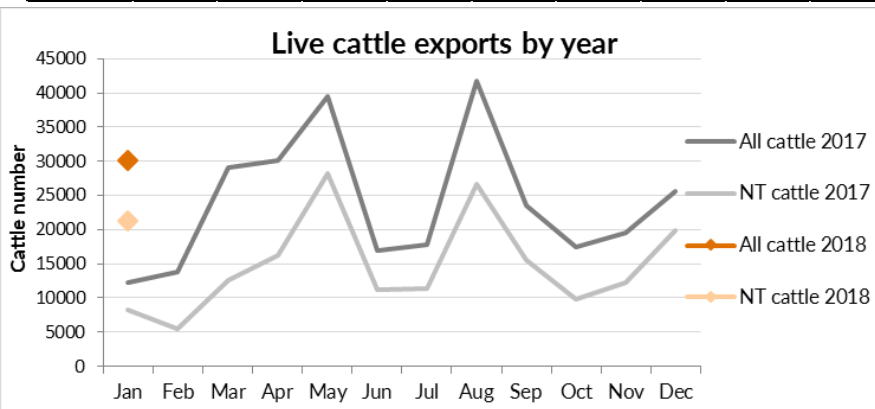
Pastoral Market Update

Live Exports via Darwin Port – JANUARY 2018

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

CATTLE

Destination	Export of ALL CATTLE (including interstate)							Export of NT CATTLE (estimate only)						
	2016	2017	Last year to 31/01/17	YTD to 31/01/18	Jan	Last month	Difference	2016	2017	Last year to 31/01/17	YTD to 31/01/18	Jan	Last month	Difference
Brunei	3,379	2,793	0	0	0	0	0	2,314	1,701	0	0	0	0	0
Indonesia	296,230	226,304	11,067	27,364	27,364	19,775	7,589	195,037	138,912	7,537	19,264	19,264	15,266	3,998
Philippines	4,697	0	0	0	0	0	0	3,236	0	0	0	0	0	0
Sabah	0	2,640	0	0	0	0	0	0	1,680	0	0	0	0	0
Sarawak	1,220	2,138	0	0	0	0	0	843	1,189	0	0	0	0	0
Malaysia	10,959	12,557	0	0	0	0	0	7,476	7,671	0	0	0	0	0
Vietnam	36,405	39,989	1,127	2,830	2,830	5,904	-3,074	24,783	25,884	767	1,992	1,992	4,558	-2,566
Egypt	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thailand	0	800	0	0	0	0	0	0	535	0	0	0	0	0
Cambodia	2,766	0	0	0	0	0	0	1,936	0	0	0	0	0	0
TOTAL	355,656	287,221	12,194	30,194	30,194	25,679	4,515	235,625	177,574	8,304	21,257	21,257	19,824	1,432



OTHER LIVESTOCK

Destination	Buffalo		Goat		Camel	
	YTD	Jan	YTD	Jan	YTD	Jan
Brunei	0	0	0	0	0	0
Indonesia	0	0	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	0	0	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

CATTLE MOVED FROM NT TO INTERSTATE

Destination	Jan	YTD as at 8/02/2018
NSW	264	264
QLD	658	658
SA	495	495
VIC	281	281
WA	0	0
Total	1,698	1,698

NATIONAL CATTLE PRICES

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

CURRENCY EXCHANGE RATES

Total of ALL CATTLE through Port of Darwin							Total of NT CATTLE through Port of Darwin						
2011	2012	2013	2014	2015	2016	2017	2011	2012	2013	2014	2015	2016	2017
269,617	246,990	359,616	493,958	487,568	355,656	287,221	253,797	234,249	308,784	324,477	287,892	235,625	177,574

A word from the Chief Veterinary Officer

Hello - as you may be aware, I am Chief Inspector under three Northern Territory acts:

- The *Livestock Act* – our principal animal biosecurity legislation
- The *Meat Industries Act* – abattoirs, pet meat and wholesale butchers
- The *Veterinarians Act* – where I am President of the Board.

I am currently reviewing the *Livestock Act* which, amongst a great number of biosecurity issues, will see the adoption of the Australian Animal Welfare Standards for cattle, sheep and saleyards/depots. Universal welfare standards for handling, care, fitness to travel and killing are already in operation with the past adoption by regulation of the Land Transport Standards for Livestock.

Recently, the Northern Territory cattle tick program has been under review, with a number of options proposed to the livestock industries. The Northern Territory Cattleman's Association (NTCA) has provided a response supporting the continuation of the cattle tick program, with suggested improvements particularly in regard Parkhurst tick surveillance.

As producers, you are an important part of the NT and national animal health surveillance system that supports our public amenity, food safety, animal welfare and market access for primary produce. I have recently made **Melioidosis and Psittacosis** notifiable diseases in the NT to ensure that collectively we can better manage any public health aspects of these diseases. I want to mention the following cases from the past 12 months:

- **Lead residues** in cattle continue to surface. Discarded lead rubbish is the main issue.
- The alert for **Brucella Suis** has not confirmed any Brucella infection – a severe zoonoses.
- **Melioidosis** continues to be diagnosed in many species around Darwin.
- There has been the normal run of **Australian Bat Lyssavirus exclusions** in bats but no further cases. Post-exposure Rabies vaccine is available under a fee for service arrangement through DPIR for pets exposed to bats.
- There have been few **Hendra** exclusions for equines. We continue to seek samples from undiagnosed sickness in horses
- **Non-inflammatory Liver disease in young dogs** – named “**Humpty Doo Dog Disease**” resulted in only two further possible cases in this build-up / spring. Theories as to the cause favour a seasonal poisonous plant, possibly a fungi fruiting.
- An epidemic of stock worker illness last wet season was confirmed as **leptospirosis**. A parallel investigation in young cattle demonstrated massive seroconversion to a selection of serovars but the illness in these cattle was shown to be an encephalitis due to **Bovine Herpes Virus 5**. At around 1% mortality – this may be more common than reported.
- DPIR confirmed a classic **Bovine Pestivirus Persistently Infected (PI)** case. Virus is endemic.
- **Salmonellosis** in two separate aviaries with significant losses of expensive birds.



Figure 15. Chief veterinary officer, Kevin De Witte

- Lastly, the NT had a significant outbreak of **Necrotising Fasciitis** “flesh eating bacteria” in greyhounds in late 2017. This is a rare but often fatal disease caused by *Streptococcus canis* that killed about six dogs before management was improved. Infection in other species is possible.

The national surveillance programs such as the National Arbovirus Monitoring Program (NAMP), TSE Freedom Assurance Program, Screw Worm Fly monitoring and Significant Disease Investigations continue to keep DPIR vets busy. There are also a number of Livestock Vet initiatives under the National Biosecurity Strategy. Berrimah veterinary Laboratory staff are happy to discuss any interesting or challenging cases that you may have, particularly where notifiable diseases are suspected. In some cases a fee for service may apply but generally livestock investigations are free. For our contacts see:

<https://www.nt.gov.au/industry/agriculture/livestock/animal-health-and-diseases/notifiable-diseases-in-animals-and-how-to-report-them>

Last week we were assessed as a government veterinary service under the OIE standards as part of a national program – there is no doubt that the report will reflect the realities of a small livestock biosecurity team charged with many responsibilities including a critical core role in emergency animal disease response.

Regards,

Kevin de Witte
Chief Veterinary Officer, NT

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. The Northern Australia Enhanced Disease Surveillance program is being trialled from 2017-2019 providing increased subsidies for cattle and buffalo disease events reported to and investigated by private veterinarians. This program recognises the higher costs and challenges associated with conducting disease investigations in more remote regions.

During October to December 2017, 37 livestock disease investigations were conducted to rule out emergency diseases or investigate suspect notifiable diseases across the Northern Territory (NT). Figure 1 shows the number of investigations by species of livestock.

Berrimah Veterinary Laboratories processed 119 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 disease incident field investigations during the quarter.

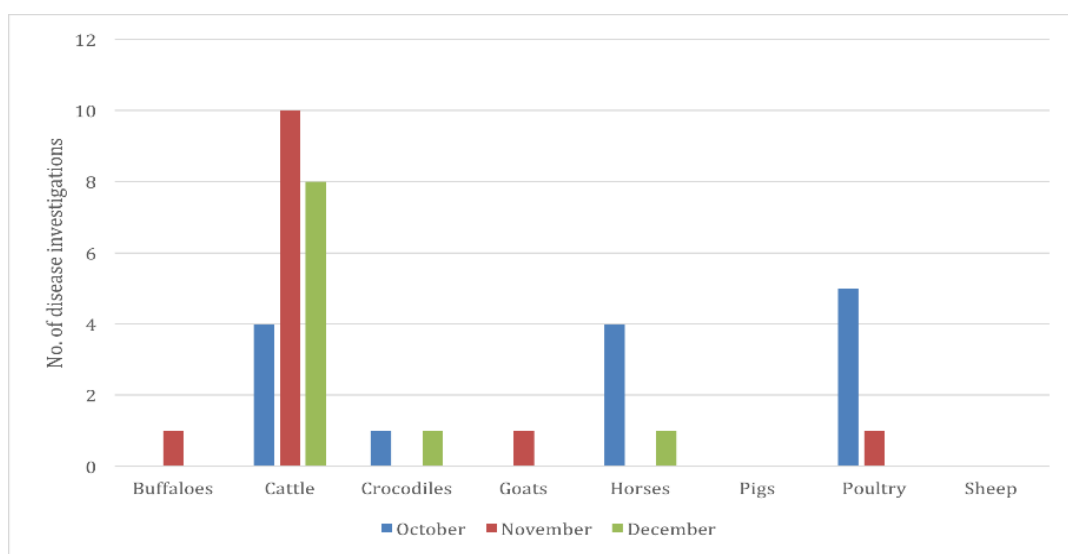


Figure 16. Livestock disease investigations by species for October to December 2017

Transmissible spongiform encephalopathy (TSE) excluded in neurological cattle

A herd of 220 Brahman-cross cattle on a small property outside Darwin were investigated in November after the owner of the property reported unusual signs in the herd.

Affected cattle were initially observed with signs of salivation, anorexia, a stiff hind-limb gait and glazed and red eyes. Over a period of 24 hours, the affected cattle began to lie down, and were unable to get back up. Over a period of eight days, one cow had died, four steers had been euthanized and one steer had recovered, despite all receiving anti-inflammatory treatments.

The cattle had been in the same paddock for the previous seven months. They were generally in poor condition despite having access to supplemental grass hay for approximately one month.

Laboratory tests of two affected animals indicated dehydration and a mild degree of muscle damage. Testing for bovine ephemeral fever virus was negative.

Post mortem examination of a three-year-old cow was unremarkable except for bone fragments in the reticulum and green ironwood leaves in rumen content. The cow was in poor body condition. Laboratory tests on tissues samples did not reveal any histological lesions, including no findings suggestive of transmissible spongiform encephalopathy (TSE) detected at the brain sites specified in the Australian and New Zealand Standard Diagnostic Protocols – TSEs.

Ironwood intoxication is suspected.

The main effect of ironwood is a cardiac arrhythmia (abnormal heart rhythm), which leads to severe debilitation. In some cases, the degeneration of the cardiac muscle is observed during laboratory examination and testing. This was not evident in this case.

The ironwood tree (*Erythrophleum chlorostachys*) is endemic in the northern region of the Northern Territory. Cattle bred in endemic areas will not usually consume the plant. The leaves of the ironwood tree are highly toxic when ingested. As few as a couple of leaves are known to be lethal to cattle. The toxic agents are diterpenoid alkaloids. Young leaves of new plants are very attractive to hungry and newly introduced grazing stock.

Given the dry time of the year and scarce availability of feed, it is likely that the hungry cattle found the green ironwood plants palatable in this case.



Figure 17. Toxic leaves of the ironwood tree

72

HOURS

Moving a horse from the cattle tick infected area?

You must give at least three day's notice (72 hours) and you must then move the horse no more than two days after the supervised treatment.

Necrotising fasciitis in greyhounds

An outbreak of necrotising fasciitis in racing greyhounds in Darwin occurred over a five-day period in October.

Four dogs presented to veterinary clinics with signs of lethargy, depression, elevated temperature, lameness and localised swelling of the forelimb or hind-limb, and intense pain disproportionate to the wound. Each infection started with a small skin lesion and progressed to a large area of necrosis (dead cells) and ulceration within a few hours. Another case presented in Darwin in November.

In all cases, affected dogs were euthanized and testing was conducted by Berrimah Veterinary Laboratories.

With varying levels of severity, further examination showed haemorrhage, oedema (swelling) and necrosis of the limbs, ecchymotic haemorrhage of lymph nodes and generalised congestion of tissues.

Four greyhounds were diagnosed with severe necrohaemorrhagic fasciitis and one with streptococcal toxic shock syndrome.

Death was reported to occur in another five greyhounds in Darwin without veterinary investigation.

Necrotising fasciitis is a rare disease in dogs caused by *S. canis*. The condition appears suddenly and progresses rapidly, leading to systemic illness, toxic shock and death if left untreated. It destroys the skin, fat and underlying muscle tissues. It may present in the form of pneumonia. *S. canis* is considered normal flora in dogs. The change to an aggressive pathogenic type that is invasive is poorly understood, but may be due to acquired virulence factors in a particular clone.

Bacteria usually enters through the skin and can be spread by contact with infected dogs or exposure in a contaminated environment. Stress associated with travelling long distances may decrease an animal's resistance to the disease.

Veterinary officers from the Department of Primary Industry and Resources (DPIR) inspected the kennels at the site and provided advice on biosecurity and disease control to dog owners, trainers and veterinarians. Two greyhound race meetings and one trial were suspended during this time to reassess biosecurity measures. Races resumed one week after the last case was reported in October.

Feral pig hunting is popular in the Northern Territory

You can hunt feral pigs on public land as long as you carry out best practice and adhere to the relevant laws of the Northern Territory (NT).

Being a responsible feral pig hunter:

- Ensure that you obtain any necessary permits. There are heavy penalties for illegal pig hunting in the NT.
- Obtain permission from the owner if hunting on private property.
- Follow good biosecurity practice to minimise the spread of diseases, pests and weeds.

This will include:

- using personal protective equipment (PPE) (Refer to section on precautions)
- good personal hygiene (hand washing, changing soiled clothes)
- good hygiene for your dogs
- cleaning and disinfecting work areas and vehicles when leaving a hunt.
- ensure your dogs are well handled and trained not to chase livestock or wildlife.

Be aware of your ethical responsibilities by ensuring that humane methods are utilised to kill feral pigs and that they are not subjected to unnecessary pain or suffering.

Pig hunting with dogs

Dogs are permitted to be used when hunting feral pigs in the NT, however strict regulations are in place under the NT *Animal Welfare Act* (as in force April 2017) and the *National Model Code of Practice for the Welfare of Animals: Feral Livestock Animals* to ensure the humane treatment of feral pigs and the welfare of hunting dogs are enforced.

Heavy penalties apply for breaches of animal cruelty when undertaking an activity that involves hunting. Penalties may also apply if you don't have the necessary permits to hunt on certain lands within the Northern Territory, including on Crown land or reserves managed by the Parks and Wildlife Commission of the NT or Parks Australia.

Additional information on feral pig hunting in the NT and how to obtain a pig hunting permit can be found on the Northern Territory Government website at: <https://nt.gov.au/leisure/hunting-and-shooting>

Managing the risk of disease

Feral pigs can host a number of diseases and parasites that may be transmitted to other animals and humans. Hunting feral pigs carries a **high risk** for contracting these potentially debilitating diseases, which have serious long-term health implications. Ensure that you take steps to protect the health of your dogs and yourself.

Butchering: You should wear appropriate PPE when butchering a feral pig. This includes gloves and footwear. Worms that you may see are not important for human health and are neutralised by proper cooking. However any abscesses found are likely to contain harmful bacteria and should result in the discard of the pig carcass. Many diseases do not show any signs in the pig carcass.

Some important shared diseases in pigs and people include:

Brucellosis- Bacterial disease causing severe long term illness, fever and influenza type symptoms. Symptoms in dogs can include fever, lameness, back pain, vomiting, lethargy and enlarged testicles. Brucellosis may be contracted by butchering and handling raw infected pig meat (especially reproductive organs), contaminated equipment and clothing, urine and contact with infected dogs.

Brucellosis is a notifiable animal disease in the Northern Territory. There is a legal obligation to notify your government veterinary officer if you know or suspect that an animal has this disease

Q Fever- A serious bacterial disease that causes severe influenza like symptoms which can be fatal. Infection is via contaminated animal tissue (especially intestinal tissue, faeces, urine and foetal fluids). Q fever is mainly spread by inhalation including during high pressure hosing, slaughtering animals and dressing carcasses.

Leptospirosis-A bacterial disease that can cause high temperatures, kidney disease, jaundice and meningitis (inflammation of the lining of the brain) which can be fatal. Leptospirosis is found in animal tissue, urine and commonly in swamp water. It enters the body through cuts and abrasions and contact with mucus membrane lining of the nose mouth and eyes.

Melioidosis – A bacterial disease. Commonly affected livestock include goats, pigs and camels. This disease has potential to be passed on to humans through contact with infected animals or soil.

Swine Influenza - Swine influenza is a highly contagious, rapid onset, respiratory disease of pigs. Pigs contract this disease through close contact with infected pigs. Swine influenza viruses are normally restricted to pigs, however occasionally a human may become infected. It is known that pigs have a potential to mix different strains of influenza viruses together to produce new strains that may have the potential to infect humans. In 2009 there was an outbreak in several pig herds in Australia that was quickly eradicated. Signs of pigs infected with Swine Influenza include:

- high fever
- discharge from eyes and nose
- sneezing
- breathing difficulties
- barking cough.

As well as diseases endemic to Australia, feral pigs have the potential to harbour and spread a number of exotic diseases not known to occur in Australia. This would have a major impact on international trade, the Australian livestock industry and our way of life.

These notifiable diseases include:

Foot-and-mouth disease – a highly contagious viral infection of domestic and wild cloven-hooved animals such as pigs, cattle, buffalo, goats and sheep. Symptoms found in animals include blisters and erosions in the mouth and on the feet, severe sickness and lameness.

Rabies – Rabies causes inflammation of the brain and spinal cord (encephalitis) resulting in death. The main symptoms include behavioural changes, varying neurological signs, progressive paralysis, coma and death in all species. This disease is also fatal in humans.



Figure 18. Enlarged testis in feral pig with *Brucella suis*

Swine vesicular disease – a highly contagious viral disease of pigs that is indistinguishable from foot and mouth disease. Symptoms include blisters and erosions in the mouth and feet, severe sickness and lameness.

Classical swine fever- a highly contagious viral disease of pigs, capable of spreading rapidly in susceptible pig populations. causing fever, purplish skin blotching and sudden death

Surra -a disease caused by the blood-borne parasite *Trypanosoma evansi* that is transmitted by biting flies. It can become established in a variety of animals including cattle, horses, pigs and dogs. Typical signs include chronic wasting, weakness, pale gums and swelling of the legs and brisket. This disease is often fatal. Surra would be virtually impossible to eradicate if it became established in Australia and is present in countries as close to Australia as Indonesia, Papua New Guinea and Timor.

Precautions to prevent the spread of infections:

- Do not feed raw feral pig meat to your dogs (especially reproductive organs, blood and offal).
- Use PPE. Cover all cuts and abrasions with waterproof dressings and wear rubber latex gloves and boots when processing feral pig carcasses to minimise exposure to potentially contaminated carcasses.
- Always wash hands and equipment thoroughly after butchering and processing feral pig carcasses.
- Wash dogs well after each hunt. Use PPE when washing and administering first aid to dogs
- Watch for signs of illness in your dogs and contact your local veterinarian if you have any concerns.

Important information

Feral pigs are a high risk for spreading diseases to humans, hunting dogs and other animals. All diseases shared with pigs are serious for people and must be diagnosed and treated by your doctor who must also notify the health authorities in case further action is required for your benefit.

- Contact your local veterinarian if you notice **any illness** in your dogs.
- Consult your doctor ***immediately*** if you develop symptoms after contact with potentially infected animals and inform them of your pig hunting practices.

If you suspect a pig disease of concern contact your Regional Veterinary Officer

Darwin 8999 2035; **Katherine** 8973 9716; **Alice Springs** 8951 8181

Or call the Emergency Disease Watch Hotline on 1800 675 888 (24hr Hotline)



Figure 19. Diseased feral pig

NT Waybills – Return PINK Copies

Have you sent your PINK copies in to your Regional Livestock Biosecurity Officer recently?

It is a mandatory requirement for cattle, buffalo, sheep, goats, camelids (including camels, alpacas and llamas), deer and pig owners to complete a waybill whenever stock are moved outside the boundaries of a property.

Pink copies must be sent within 28 days

It is an offence under the Livestock Regulations not to complete a waybill correctly and may incur a penalty for not submitting the Waybill pink copies to the Registrar in 28 days after completion.

NT PICs – use the **NT PIC Search database** - <http://pic.primaryindustry.nt.gov.au/>

National PIC Registers using your NLIS account-<https://www.nlis.com.au/> Search the PIC register

NOTE: Post PINK copies within 28 days to Regional Livestock Biosecurity Officer

Check out our Websites <https://www.nt.gov.au/industry/agriculture/livestock> or contact your RLBO for assistance

Darwin Region

Rob Wait (RLBO)
GPO Box 3000
Darwin NT 0801

Katherine Region

Josh Haigh (RLBO)
PO Box 1346
Katherine NT 0851

Tennant Creek Region

Tom Haines (PLBO)
PO Box 159
Tennant Creek NT 0861

Alice Springs Region

Greg Crawford (RLBO)
PO Box 8760
Alice Springs NT 0871



13/03/2018

[Ag Tech summit \(Melbourne\)](#)

14/03/2018

[Citrus 2018 Market Outlook Forum](#)

21/03/2018

Melbourne international flower and garden show (Melbourne)

09/05/2018

DPIR mango research update

15/06/2018

Beatrice Hill Field Day

17/06/2018

[Hort Connections \(Brisbane\)](#)

2/07/2018

[Food Futures \(Darwin\)](#)

18/08/2018

[2018 Melon conference \(Townsville\)](#)



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You can find hundreds of publications on our website. Check our publications page to search for information sheets and agnotes.

Can't find what you are looking for? Drop us an email and we will help you out.

Subscribe to our newsletters, Top Paddock, Katherine Rural Review, and Animal Health eNews to catch up on what we are doing, subscribe online here:

dpiir.nt.gov.au/primary-industry/primary-industry-publications/regional-newsletters

Our YouTube channel has a selection of “how to” videos on practical topics such as stock handling, grafting mangoes and date pollination. There are technical videos looking at measuring nitrous oxide emissions through to research updates.



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Website: www.dpiir.nt.gov.au

YouTube: www.dpif.nt.gov.au/youtube

Email: horticulture@nt.gov.au

