Top Paddock

DEPARTMENT OF **PRIMARY INDUSTRY AND RESOURCES**

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Inside this issue:

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Message from the editor

Rambutan harvested from CPRF

You know it's nearly Christmas when the mangoes are being sold by the road and the rambutan are starting to gear up.

Many government branches close down for a few days in the Christmas/new year period. There is a link to DPIR office closures for the period in the events section, including key contacts for the different branches and facilities.

Stay safe and I hope to see you all in 2019.

Ed.

CGMMV research update

CGMMV symptoms on fruit.

DPIR has been undertaking research on Cucumber Green Mottle Mosaic Virus (CGMMV) over the past few years. Areas of investigation included:

- determining the importance of weeds and non-host plants
- roles of honey bees
- evaluating the potential for in-field diagnostics to assist in rapid detection of the virus on farms.

Improved management options

CGMMV infects cucurbit plants and is responsible for significant economic losses worldwide. There are several strains of CGMMV worldwide and the primary avenue for spread is through contaminated seed.

Melons rarely show symptoms on the outside, however browning and lesions on the peduncle may indicate infection. When an infected fruit is cut open, the internal structure is sponge like with a meat texture. In this case, fruit is not suitable for sale.

Weeds and grasses identified as potential hosts of CGMMV

In glasshouse trials and field surveys, a number of weeds and grasses have been identified as potential hosts of CGMMV. These plants do not show any physical symptoms, making it more difficult to determine if CGMMV is present. These include:

- Black nightshade
- Amaranth
- Pigweed
- Sabi Grass
- Wild Gooseberry
- Crowfoot Grass
- Caltrop.

Sorghum, the most widely used wet season cover crop in the Northern Territory (NT), is not a host and is safe to plant.

Role of bees and bee hives

Two field trials were conducted in the NT to assess the role of bees in transmitting the virus. On each occasion, CGMMV was found on the flowers but not the leaves, suggesting that pollinators can introduce the virus into uninfected areas. CGMMV is typically found on the flower indicating transmission by bees/pollinators. All hive products (adult bees and brood, honey, pollen, empty cells, propolis) from the NT and Queensland trials have been shown to contain CGMMV. The pollen, honey and adult bees have the highest prevalence of the virus. The viability of CGMMV in hive products has been tested. So far, viable virus (capable of causing infection in plants) has been isolated from pollen, honey and adult bees. It is not

currently known how long CGMMV remains viable inside bee hives. For information on good apiary management read the information sheet on our melon research page[1].

CGMMV in soil

CGMMV can persist in the soil for at least 12 months, longer if infected plant debris is present. It is recommended infested areas are kept free of potential hosts (cucurbits and weeds) to ensure the lifecycle of the virus particles ends. This process can take more than 12 months. In the USA, it is recommended that infested soils are left to fallow for three years.

Now that the project is starting to wrap up, much of the information has been published on the internet. For more detailed information head on over to our melon research page.

Sweet Spot project kicks off (gets moo-ving) across the north

Brahman cattle lining up for the Sweet Spot project

By Robyn Cowley, Senior Rangelands Scientist Livestock Industries

The Cash Cow project found that there was an opportunity to improve breeder performance in some areas of northern Australia. Previous research has focused on disease, herd management and genetics, but little is known about how different levels of pasture utilisation impact breeder productivity. The Sweet Spot project will address this knowledge gap and find the *sweet spot* of pasture utilisation to ensure long term optimal breeder performance in northern Australia. The project is funded by Meat and Livestock Australia and brings together pasture and cattle scientists, and modellers from across the north. The $2M project, over four

[1]https://dpir.nt.gov.au/primary-industry/primary-industry-strategies-projects-and-research/plant-industries-research-and-development/melons

years, is led by the NT Department of Primary Industry and Resources (DPIR), collaborating with the Queensland Departments of Agriculture and Fisheries, and Environment and Science.

The project will use existing breeder datasets to ask new questions, increasing the value of previously funded research. “There is an untapped gold mine of breeder production data from sites across northern Australia. By bringing together these existing datasets we will gain new insights into how to manage breeders to improve reproduction,” DPIR’s Dr Robyn Cowley said. The project aims to develop tools to predict the impact of pasture utilisation on reproduction, so producers can optimise pasture use to maximise kilograms turned off, while maintaining the resource base.

The project team had their first meeting in August. The first phase of the project is searching across the north for suitable breeder datasets that can be collated and modelled.

For more information call Dr Robyn Cowley, Senior Rangeland Scientist NT DPIR, on 0419 829 493 or Dr Kieren McCosker, Senior Livestock Scientist NT DPIR, on 08 8973 9771.

An experts opinion on future northern Australia rainfall due to climate

Different faces of the NT landscape- what will the weather of the future look like?

Robyn Cowley, Senior Rangeland Scientist, Livestock Industries Development

When it comes to predicted climate change in northern Australia, there is a lot of uncertainty about how rainfall might change, which is not very helpful because rainfall is the most important driver of agriculture! So I was very interested to see a recent webinar on future rainfall in northern Australia that provided new insights in this area. For more information visit the Earth Systems and Climate Change Hub[2].

Dr Josephine Brown from the Bureau of Meteorology modelled future rainfall (2070 to 2099) for northern Australia. She used 35 different global climate models and looked at a number of emissions scenarios – basically different estimates of what carbon dioxide levels might be in the future.

There was a big variation in future rainfall predictions between the different models, with 43% of models predicting it will be drier, 37% predicting wetter, and the remainder not predicting much change. This study investigated why the models differed in their rainfall predictions to work out what is more likely.

- The models that predicted a much drier future were not very good at simulating tropical climate patterns, so are probably unreliable. This left the models that predicted no change or wetter.
- Dr Brown then looked at the effects of aerosols on future rainfall (this is the first time I have seen this included in climate change projections for our region).

[2] http://nespclimate.com.au/how-will-rainfall-change-in-northern-australia-over-the-coming-century/

- Aerosols (pollution from fires, cars, power generation and industry) are very important in predicting rainfall because 1) they cool the planet by scattering and absorbing incoming radiation, and 2) water vapour condenses on the aerosol particles (condensation nuclei), creating clouds, which increases rainfall.
- Some climatologists think pollution over Asia may have contributed to recent higher rainfall over north-western Australia (Victoria River Downs to Kimberley) since the 1970s (e.g. see boxes below), but whether the higher rainfall is due to natural variability, aerosols, or both is still an active area of research.
- They think pollution over Asia has contributed to the relative cooling and drying of that region. When climate change models assume that aerosols will decline in the future due to better pollution controls in Asia, the Australian monsoon gets drier and the Asian monsoon gets wetter again, i.e. back to what it was like around 50 years ago.
- Most of the modelled future increases in rainfall in north-western Australia are in response to regional climate warming. But if pollution decreases over the Asian monsoon region, a warmer Asian monsoon region would draw rainfall northwards away from Australia. This would offset any increases in rainfall in north-western Australian due to warming resulting from climate change.
- Hence the models that predict the greatest increase in rainfall do not fully include the effects of future declining pollution and aerosols, and may be overly optimistic about future rainfall projections.
- In summary, the reason there is such a wide variation in predicted future rainfall for north Australia between different climate models is that some just aren't very good at modelling climate in our part of the world (they predict a much drier future) and some don't include the effect of aerosols (they predict a much wetter future).
- This leaves us with probably little change in future rainfall in northern Australia.

What does this mean?

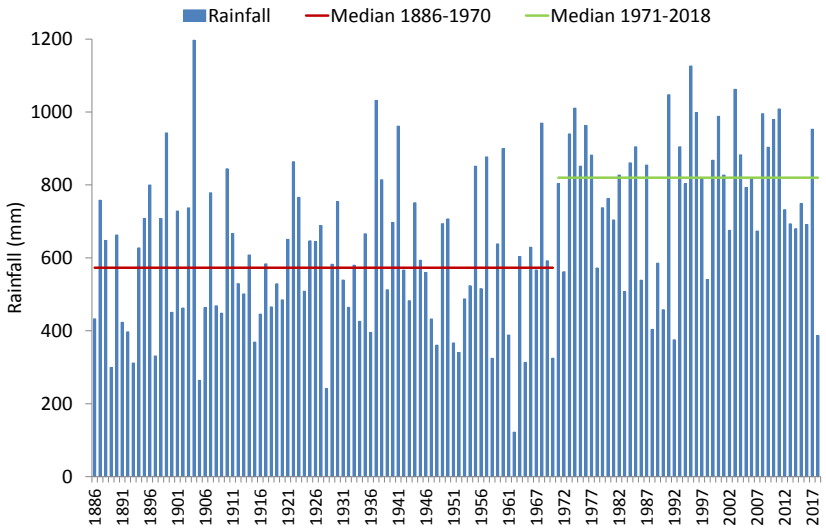
- It probably won't get wetter in the future.
- Don't assume the recent higher rainfall in Victoria River Downs and the Top End (last 40 years) is here to stay.
- Nobody knows how much and when future rainfall will change, so adjust stock numbers to the seasons so that you don't get caught out as the climate fluctuates or changes.

Rainfall has increased in north-western Australia, but it could decline again

The median rainfall at Victoria River Downs between 1886 and 1970 was 573 mm. Since 1970 the median rainfall has been 820 mm. This very large difference has contributed to higher carrying capacity more recently. But whether the higher rainfall is here to stay is uncertain. Some scientists think that pollution in Asia has caused strengthening of the Australian monsoon over north-western Australia. If this is correct, it follows that if Asian pollution is cleaned up, our rainfall could decline to pre-1970 levels again. Other scientists think that it is just climate variability. Either way, the higher rainfall may not be here to stay.

How has rainfall increased in north-western Australia?

To better understand what has caused increased rainfall in north-western Australia, scientists investigated how wet season rainfall regimes (e.g. localised thunderstorms, monsoonal lows, or tropical cyclones) have changed in the last 50 years (see papers below). They compared whether the different rainfall regimes now occur more often, or if the daily rainfall of the different rainfall regimes has increased.



Actual rainfall at Victoria River Downs since 1886. The last 50 years have been wetter on average. Rainfall data from the Bureau of Meteorology.

What's changed in the last 50 years?

Both studies found that the average rainfall per day (rainfall intensity) during each of these rainfall regimes has not changed much in the last 50 years. However the frequency of the heavier rainfall regimes, monsoonal lows and cyclones, has increased; while the frequency of isolated thunderstorms has declined. Combined, this has led to higher average rainfall. The wet season in Darwin also now starts earlier (November) and persists longer (April). On average the wet season in Darwin is now 33 days longer than in 1950. At the same time rainfall in September and October has declined.

What does this mean?

There are now more days with heavier rainfall systems during the wet season, leading to higher annual rainfall. Where rainfall is already high (>900 mm), this probably means more runoff and not much more native pasture growth due to nutrient limitations to growth. However the lengthening of the wet season has probably been beneficial for cattle production with pasture staying green for an extra month of the year. In areas with rainfall in the 500 to 700 mm rainfall zone, the higher rainfall probably means more pasture growth but with lower pasture quality.

Although we know that rainfall has increased in the Top End and VRD, no-one knows if this wetter period is a permanent change or whether drier times will return. If they do, pasture growth is likely to decline especially in the central to southern Victoria River Downs.

Further reading

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Clark, S., Reeder, M., and Jakob, C. (2018) Rainfall regimes over northwestern Australia. Quarterly Journal of the Royal Meteorological Society 144(711), 458-467.

[3] https://agupubs.onlinelibrary.wiley.com/doi/pdf/10.1029/2012JD017472

Nominate for the AgriFutures Rural Women's Awards

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. The award provides a platform to inspire and support Australian women to use and develop their skills to benefit their industries and communities.

Nominations for the 2019 NT Rural Women's Award are now open. The award is open to all women involved in rural industries, rural and regional businesses and rural and regional communities.

- Location is no barrier. If you want to create impact, innovate and make a difference and/or contribute to enhancing the prosperity of rural and regional Australia, then we want to hear from you.
- Women must be over the age of 18, and Australian citizens or permanent residents.
- No formal qualifications are required.

On Thursday 27 September 2018 a webinar was held to allow 2019 applicants to go through any questions they might have about the application process. A recording of the webinar is available to watch[4].

How to nominate

Detailed award guidelines and information on how to nominate can be found on the AgriFutures™Australia website. Applications for NT applicants close at 10.30pm Australian Central Time on Sunday 27 January 2019.

What does the winner receive?

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 NT winner represents the NT as a finalist in the national award. The national winner will be awarded an additional $10,000 bursary and national runner up, an additional $5,000.

Visit the AgriFutures™ Australia[5] website for more information.

Applications for NT applicants close at 10.30pm Australian Central Time on Sunday 27 January 2019.

AgriFutures Australia

[4] https://youtu.be/ru1UXULpPFg
[5] https://www.agrifutures.com.au/people-leadership/rural-womens-award/

In brief: NT Young Farmers group

The NT Young Farmers is a dynamic new group for young farmers and agricultural professionals to network with one another and voice opinions. Spanning across all production industries including turf, vegetables, seafood and packing, this group is about meeting other young people in a social setting, making connections and building relationships.

The group has a Facebook page[6] and members often meet for drinks to chat about life, industry and their future as leaders of industry. If you are interested in joining the group speak to Laura Cunningham from NT Farmers on 0405 287 344; Email: ido@ntfarmers.org.au

Doris, the new face of potted colour.

Looking for some potted colour for Christmas? Two new curcuma hybrids, Doris and Houlty, are now available at Bunnings.

The Department of Primary Industry and Resources (DPIR) ornamental breeding program has been ongoing for many years, culminating in the commercialisation of a pair of stunning hybridised curcumas by local wholesale nursery the Plant Smith.

The work from a RIRDC research project in partnership with a nursery industry co-operator has led to further development of these varieties, identified as having desirable attributes for production as a potted flowering plant.

Named Doris and Houlty after the DPIR research staff involved in the ornamental program, the flowers feature strong “Siam Tulip” forms in rose pink and white. Perfect for cut flowers and potted colours, the plants bloom during the wet season and then die back to a tuber in the dry season.

Further work is being investigated into the use of mutagenesis to generate genetic variations for new hybrids.

For more information contact Doris Marcsik on 08 8999 2017. Curcumas from the DPIR breeding program are in store now.

Doris Marcsik with her namesake curcumas (left) Curcumas from the DPIR breeding program are in store now (right)

[6] https://www.facebook.com/groups/1052464504905172/

In brief: Citrus canker identified in Nakara

Citrus canker symptoms on a leaf.

Another citrus plant infected with citrus canker disease has been detected in Darwin. A member of the community reported the suspected disease symptoms to the citrus canker hotline, and the department has confirmed the disease.

The affected plant was located in Nakara, and a restricted area has now been declared around the detection. Movement restrictions for citrus and host plants and material are now in place in the Nakara restricted area, aimed at limiting the spread of the disease in the Territory.

A map of the Nakara restricted area can be viewed on the citrus canker website[7].

As part of the emergency response, all citrus and host plants must be removed from the restricted area. The emergency response team will work with residents to remove affected plants in consultation with residents beforehand. The Nakara restricted area does not impact any commercial citrus growers.

Citrus canker is not harmful to humans or animals, but is highly contagious. It affects the quality and quantity of citrus fruit produced, and the ability of citrus growers to sell their produce interstate and internationally. The wet season and cyclone season are the periods of highest risk for the spread of citrus canker, with strong winds and rain carrying the disease.

Growers and residents who identify possible symptoms on a plant are asked not to move or destroy plants, but call the emergency response team to investigate. A telephone hotline, operating 24/7, is available for reporting suspected cases of citrus canker, and for seeking further information about the emergency response. Residents can call the citrus canker hotline on 1800 931 722.

Plant Health Inspectors: Biosecurity knowledge and expertise with a heart

Plant health inspectors are out and about in Darwin checking citrus for canker symptoms.

An enthusiastic and diverse team of Plant Health Inspectors is the public face of the program to eradicate citrus canker in the NT.

Working with residents to identify citrus plants, and other plants that may host the citrus canker disease, the team is also responsible for the secure removal of affected plants in identified restricted areas of the Territory.

[7] https://nt.gov.au/citruscanker

Daisy Lippiatt is one of the newer recruits to the team, with a Bachelor of Environmental Science (Honours), and experience that includes eradicating invasive ants in remote areas.

Daisy says one of the challenges, in addition to working in the heat, has been the emotional aspects for residents when their much-loved citrus plants need to be removed. “We worked with one gentleman to remove seven different varieties of citrus plants on his property. He had nurtured and cared for his plants over a number of years, with each plant having three different layers of mulch, and lots of love and attention. He was obviously very sad to lose his plants, but he understood the need to remove them because he lived in a restricted area,” said Daisy.

Mark Thomas, Plant Health Inspector, is a former dairy farmer and crop farmer with hands-on experience managing plant and animal diseases. Mark also reflected on the personal and emotional attachment some residents have for their citrus plants. “When we need to remove affected plants it’s really important for us to be clear and honest about why we are doing this,” explained Mark. “The residents in the restricted areas are personally impacted, but the citrus canker disease could have a much larger impact - on citrus farmers, workers and jobs across Australia - if we don’t remove the disease here in the Territory. When residents understand the bigger picture, and how important their support is, they are more willing to come on board.”

Jake Armistead, Team Leader, Field Operations, has enjoyed meeting and working with residents in greater Darwin and Katherine. An encounter with a particularly affectionate pet pig was all in a day’s work for Jake. “I was only in my first week or two as Team Leader when I met Pepper the pet pig. We were inspecting a couple of citrus plants on a Darwin property and Pepper, a resident on the property, came over to investigate”, said Jake.

Pepper welcomed Jake and his colleagues with some gentle nudges and friendly grunts and all was going well until Jake gave her a little pat. Jake explained: “It turns out she LOVES getting pats and attention. SERIOUSLY loves getting pats. And she can be very persistent asking for pats – all 200kg of her. My work mates love the fact I was nearly – literally - bowled over by Pepper and her demands for my attention. And they have a photo to prove it.”

Jake Armistead and Peppa the pet pig

The Plant Health Inspectors value the conversations and engagement they have with Territorians regarding the citrus canker eradication work. Anyone who wants to know more about citrus canker, or would like to book an appointment for a Plant Health Inspector to check their property for citrus canker host plants, is invited to contact the citrus canker response team via:

Phone: 1800 931 722; Email: citruscanker@nt.gov.au;
Website: https://dpir.nt.gov.au/citruscanker

Industrial hemp: a future prospect for the NT?

Dr Warren Hunt, NT DPIR

Industrial hemp

Industrial hemp legislation is currently being drafted to enable a new commodity to establish and operate in the NT. If the legislation passes, and following the creation of supporting regulation, The Department of Primary Industry and Resources (DPIR) intends to work with primary producers to help familiarise them with the crop, learn from others in the developing industry, and determine if there is an opportunity for them in that space.

Current situation

The NT is currently drafting legislation to allow the lawful development of an industrial hemp industry based on the cultivation and processing of low tetrahydrocannabinol (THC) *Cannabis spp.* (≤ 1%) to be used for food, fibre and other industrial end uses. This specifically will exclude the extraction or diversion of any cannabinoids for medicinal purposes. All other State and Territory Governments in Australia have already established legalisation and licensing arrangements to accommodate industrial hemp production. The NT remains the only jurisdiction where industrial hemp cannot be legally grown – but that will change in 2019.

In most Australian and international jurisdictions the level of THC in industrial hemp is typically set at thresholds of <1% of dry weight, while the THC level in narcotic/medicinal cannabis varies from generally from 3% to in excess of 15%. Low THC varieties are commonly referred to as hemp, industrial hemp or industrial cannabis. From November 2017, legislative changes enabled industrial hemp produce derived from the seed e.g. oil, flour, pressed cake or whole grain etc., to be legally consumed as food in Australia. The NT *Misuse of Drugs Act* has been amended to accommodate the changes.

Until such legislation is passed, possession of cannabis material (seed, leaf, flower heads, resin etc.), is illegal, and constitutes a criminal offence.

So hold out and watch for further notice of legislative and regulatory development in 2019.

Medical cannabis vs industrial hemp

Not to be confused with industrial hemp, medicinal cannabis can now be propagated in Australia under Australian Government law. Under the auspices of the Narcotic Drugs Amendment Bill 2016, the Australian Government has set the 'authorising environment' for producing medicinal cannabis in Australia. Persons authorised under this Act can potentially grow high or low THC varieties and extract the respective cannabinoids for commercial use in therapeutic products. All past inconsistencies with various State and Territory legislation have been resolved.

Industrial hemp crOp uses

Industrial hemp is grown for fibres found on its stalk and for seed and/or grain. Hemp fibre has typically been used for industrial purposes, such as the manufacturing of textiles, ropes and lines, paper and building materials and its grain as a highly nutritious food source, either as a whole grain, an emulsified cake, flour, or pressed oil. Other value-added products include health lotions, sunscreens, shampoos, soaps, beer, biofuels, animal bedding, stock feed, insulation and car mouldings.

Food produced from industrial hemp does not have any psychotropic properties.

Certain plant compounds may also have application for non-therapeutic uses, an example being potential biocides or carriers for aromatic fragrances (such as with air fresheners).

Industrial hemp as a proliferator of illicit crops?

Police forces in Australia and internationally have previously expressed concern that high THC lines of cannabis, that is illicit cannabis, could cross fertilise legitimate hemp crops, creating increased THC levels in subsequent crops produced from that seed. It is important to understand that this is not likely to occur as management strategies for illicit narcotic crops run counter to management strategies for legitimate hemp crops.

- Under legitimate management, when seed development commences, the plant ceases THC production – something illicit producers of drug crops do not want. The narcotics trade actively manages to avoid pollination. As a result, they are unlikely to fertilise legitimate hemp crops.
- It is in the interest of the legitimate hemp grower to eliminate any local weed cannabis plants on their farms that might affect their crop and in turn their licencing.
- The pollen released by male plants in industrial hemp fields would be much greater than the 'illicit cannabis patch plants'. The presence of industrial hemp fields destroys the value of nearby illicit cannabis crops by fertilising the females, making them produce seed instead of THC.

Where is the opportunity for the NT?

A literature review of the prospects for industrial hemp in the NT was undertaken by the department in 2015. Subsequent to this, industrial hemp has been trialled under strict licences in the NT. Further work is needed to determine varieties, rotations and fine-tune the agronomy and explore compatible agro chemicals. DPIR agronomists have looked at the performance of existing varieties and are keen to work with interested producers in future farming systems.

Small plot experimental trials were conducted by DPIR in 2016 with low THC hemp varieties at Katherine Research Station. The results indicated that one variety tested was able to realise comparative yields of between 2.0 and 4.8 t/ha. THC levels in the trials were < 1% which is ideal. Hemp grain is presently a lucrative commodity with a farm-gate price of approximately $3,000 per tonne. The crop length (approximately 90 days), may also position it well either as a break-crop or for a double-crop cash crop. The trials provide an indication that hemp grain production may be a viable proposition as a dry season crop but further work is required on growth potential at different times of year in the NT.

Seed development on a hemp plant causes THC production to cease.

The industrial hemp growing sector is in its infancy in Australia and consequently needs a reliable source of future seed supply of accredited grain or fibre varieties. A seed production system based over the Top End dry season, or the central Australian cool season (May to October), may be a commercial idea worth exploring. Seed produced from trial mentioned above was not fully tested for viability. Further work is required to confirm the seed production potential for NT.

Further reading

For further information on changes to NT legislation and policy about industrial hemp, contact Warren Hunt 08 8999 2143

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- Ecofibre Industries Limited (EIL), (2014a). Ecofibre's Industrial Hemp Fibre Production Guide.
- Ecofibre Industries Limited (EIL), (2014b). Growing Hemp Grain/Seed in Tasmania, Qld and NSW.

In brief: 2018 Melon Conference

The 2018 Australian Melon Industry Conference and Field Day was held on 17-20 September. Department of Primary Industry and Resources staff Dr Lucy Tran-Nguyen and Dr Mary Finlay attended the conference and presented some of their work on Cucumber Green Mottle Mosaic Virus (CGMMV).

A highlight of the conference for Mary was the panel discussion by Jon Caleo, Paul McLaughlin, Brad Mills, Anthony Joseph and Dianne Fullelove. It gave an insight into what growers were worried about and what they were thinking. A strong theme was disappointment with the regulations about how their levy money was spent, and not being able to spend funds on protecting the industry during biosecurity issues and food safety scares.

There was significant grower interest in Anthony Joseph's talk on the second day where he introduced a supply chain app called Phoenicia. Further information on the presentations from the field day can be found on the Melons Australia webpage[8]. A summary of the CGMMV work can be found in the newsletter or on our melons and /or vegetables webpage[9].

Profitable Grazing Systems

Over the years, Meat and Livestock Australia (MLA) and other organisations have run numerous field days, workshops and other training events to share information but many producers have indicated that they would like more support to build their skills and implement what they've learnt into their business. The new 'Profitable Grazing Systems' initiative from MLA is designed to provide that.

The aim of the program is to develop tailored short courses, delivered over six to 18 months which allow you to develop and practice your skills with small groups of like-minded producers. The course will be delivered by an accredited coach or facilitator, assisted by specialist technicians where relevant.

Delivery is flexible and may include a mix of online webinars, teleconferences, workshops and one-on-one property visits. There are a number of existing courses already available across the key topic areas of nutrition, breeding, grazing land management, people and business. These can be tailored to meet the needs

[8] http://www.melonsaustralia.org.au/industry-news/2018-australian-melon-industry-conference-field-days

[9] https://dpir.nt.gov.au/primary-industry/primary-industry-strategies-projects-and-research/plant-industries-research-and-development/melons

of a group in the NT or a completely new, unique course can be developed to provide the specific skills you need.

Subsidies are available to help cover the cost of the course.

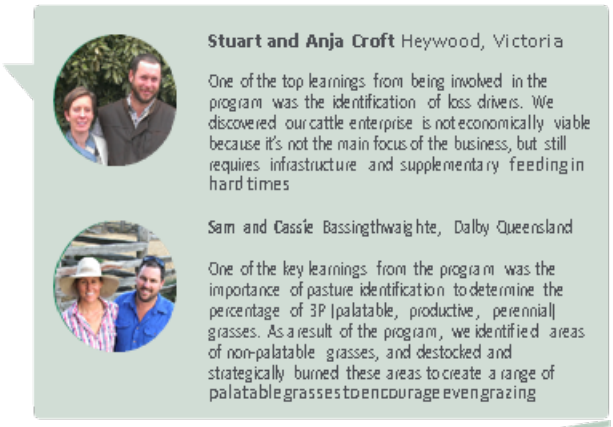
Three good reasons to get involved in Profitable Grazing Systems

1. It takes a whole-of-farm business approach to improve business performance and drive profit.
2. It customises and tailors industry research findings and management options to your local environment.
3. You work with small groups of like-minded producers with an experienced coach to support you.

What participating producers say

130 producers have already participated in Profitable Grazing Systems and say the benefits include:

- learning new skills and applying them to their individual farming systems
- seeing and hearing what other producers are doing
- making decisions based on tangible numbers.



Profitable Grazing Systems
your pathway to success

mla
MEAT & LIVESTOCK AUSTRALIA

To find out more, contact the NT State Coordinator – Rebecca Mohr-Bell

rebecca@argyllconsulting.com.au; 08 8977 0134

NT Soil Consortium to build land manager capacity

Learn more about your soil with the new NT Soil Consortium.

Territory Natural Resource Management (Territory NRM) has been successful in obtaining a Smart Farms Small Grant through the Australian Governments National Landcare Program. The grant will be used to initiate an NT Soil Consortium to build land manager capacity and knowledge in soil health and conservation. The consortium will bring land managers from various industries and soil experts together through workshops, symposiums, and networking, to ensure knowledge passes in an effective manner.

The NT Soil Consortium encourages everyone who has an interest in the land and their soil to be involved. From backyard gardeners, to horticulturists, to pastoralists, the consortium will benefit everyone. The advantages of peer-to-peer, farm-to-farm learning is the basis of the consortium. The opportunities that come from networking, training, and learning will allow the NT to become resilient against challenges facing those who work on the land.

For further information and if you wish to be involved, join the Facebook group 'NT Soil Con[10]sortium' or please contact:

Jacob Betros, Territory Natural Resource Management

T: 0438 756 481; E: jacob.betros@territorynrm.org.au

Northern Territory Soil Consortium

Territory Natural Resource Management

[10] https://www.facebook.com/groups/NTSoilConsortium/

Make sure your animals are cyclone ready

Pet and livestock owners are reminded to make sure their animals are prepared for emergencies this wet season. Whether you own a canine, feline, equine or anything in between – it pays to be prepared.

Pets

When planning how to take care of your pets in an emergency or disaster, you should:

- ensure your pets are microchipped, registered and have your phone number on their collar tag
- include your animals in your household emergency plan
- prepare a pet emergency kit with food, water, equipment and medications
- know in advance where to take your pet if it is unsafe for them to remain at your property
- check with your local council or other agencies about any temporary animal shelters and yards that can be used during disasters.

Horses

The safest preparation is to move your horse out of the area likely to be impacted by an emergency. A late evacuation could increase the chance of injury or death, particularly if the horse is hard to catch or difficult to load.

If you leave horses, it is preferable to leave them in a sound structure or stable with loose objects tied down. Prepare your horse emergency kit today. Include:

- food and water for a minimum of three days
- feed buckets
- blankets and towels
- extra lead rope and halter
- wire cutters
- torch, portable radio and fresh batteries
- equine first-aid items
- information about whether your horse is branded, registered or microchipped, stored in a waterproof container
- an emergency contact number for a vet stored in a zip-locked bag or waterproof container.

Livestock

The best preparation for livestock is to relocate them to a safe location as early as possible. If this is not possible, follow these precautions:

- In a flood, move animals to high ground with adequate natural feed. Additional feed may be required for stock stranded for extended periods.
- In a severe storm or a cyclone, place animals under solid cover if possible (e.g sturdy stable, shed or covered pen).
- In extreme circumstances, the best option may be to cut fences so that stock can escape danger.

Find out more, visit securent.nt.gov.au

Small trees, large potential?

Dr Matt Hall & Dr Danny Guinto attended the recent mango and avocado orchard intensification and robotics field day, Walkamin QLD.

The use of dwarfing rootstocks and high density plantings is nothing new for fruit crops. These cropping systems have been used for decades in stonefruit and pipfruit to drive efficiencies and returns for growers. It is, however, a new concept for terminal bearing evergreen fruit crops such as mango and avocado. The Queensland Department of Agriculture and Fisheries (QDAF) recently hosted a field day at their Walkamin Research Facility to discuss their research into rootstocks and high density plantings.

Rootstocks are used to regulate tree vigour by diverting more energy from photosynthesis into the fruit and less into root and canopy growth. This results in smaller, slower growing trees which require less pruning, are easier to harvest and can be planted at closer spacing to produce significantly higher yields per hectare.

“Kensington Pride is the most vigorous rootstock and is widely used in the industry as it’s convenient. The key message from QDAF was that to reduce tree vigour, any other rootstock is preferable to KP.”

This cropping system has worked extremely well for deciduous fruit crops where fruiting buds are formed on wood from the previous season. The challenge for terminal fruiting crops such as mango and avocado, is that flowering buds form on hardened vegetative growth over the preceding summer. Therefore, reduced vigour has the potential to lead to less vegetative growth and, as a consequence, less flowering sites. Growers in the NT currently control vigour by immediately pruning trees after harvest and then drought stressing them coming out of the wet season to promote early flowering. As a result, considerations around the management of tree vigour in the NT are very different to those on the Atherton Tablelands in Queensland where vigour control is a significant consideration of orchard management.

This change from a conventional planting density of ~200 trees/ha to an intensive high density planting of ~1,200 tree/ha has the potential to significantly increase yield on a per hectare basis. The QDAF mango trial includes the varieties Keitt, Honey Gold, Calypso™ and NMBP 1243[11] (national mango breeding program, Kensington Pride hybrid) planted at low (208 trees/ha), medium (416 trees/ha) and high (1250 tree/ha) densities. Trees at the highest density were also trained using a trellis system. Trees are currently five years old with a wide range of data being collected over this period. This data indicates that for a conventional planting density of ~200 trees/ha the yield for Calypso™ is ~8 t/ha compared to ~34 t/ha for a high density planting with ~1,200 plants/ha. This represents a significant improvement to production on an area basis, as has been achieved in deciduous systems. However, on a per tree basis there doesn’t seem to be any benefit to high density plantings as low density plants achieved on average 40 kg/tree while high density plantings achieved 28 kg/tree.

High density mango trees in Walkamin, are they the next “big” thing or just a passing phase? Planting densities of up to 1,200 trees per hectare are being trialled.

High density plantings in the Katherine region are planned for early next year. If you would like more information, please contact Matt (Darwin) or Danny (Katherine).

matt.hall@nt.gov.au or 0422 938 529; danilo.guinto@nt.gov.au or 08 8973 9737

Setting the facts straight on glyphosate

Matt Hall

Recently there has been a lot of noise in the media about the negative health effects of glyphosate. This article aims to summarise the key aspects and provide information to growers in the NT regarding this issue. The full article is available on LinkedIn.

[11] https://www.agric.wa.gov.au/mangoes/new-mango-hybrid-nmbp-1243

New Principal Veterinary Officer

Dr. Tony Kettle

Dr Anthony Kettle (Tony) is a graduate of Massey University in New Zealand and had his own practice in Sydney for 10 years before moving to practice in Brunei for three years, and Oman for four years. He then spent more than 10 years in Dubai involved with the international movement of horses, quarantine and biosecurity in the United Arab Emirates, before joining Equine International Consultancy Free Zone Limited Liability Company in 2015 as the Executive Director.

For the last three years Tony has been advising governments on the conditions for international movement of horses, biosecurity and contingency planning. He is a consultant for the World Organization for Animal Health (OIE) and has served on multiple specialist ad hoc groups for the OIE including Glanders, Surra, Biosecurity and the High Health High Performance (HHP) protocols. Tony is a published author on Glanders (a disease closely related to Melioidosis seen commonly in northern Australia), and Shipping Fever in horses.

Tony is the Secretary of the International Movement of Horses Committee and a member of the Welfare Committee of the International Federation of Horse Racing Authorities in Paris. In addition to science and veterinary degrees, he holds a Master of Business Administration from Heriot-Watt University in Financial Risk Management.

While in Brunei, Tony wanted to buy property in Australia with a similar climate to Brunei and bought property in the NT more than 16 years ago. He visited every year before finally making the decision to commit full time to the NT. Tony welcomes the opportunity to contribute to biosecurity, animal health and welfare in the NT through the Department of Primary Industry and Resources

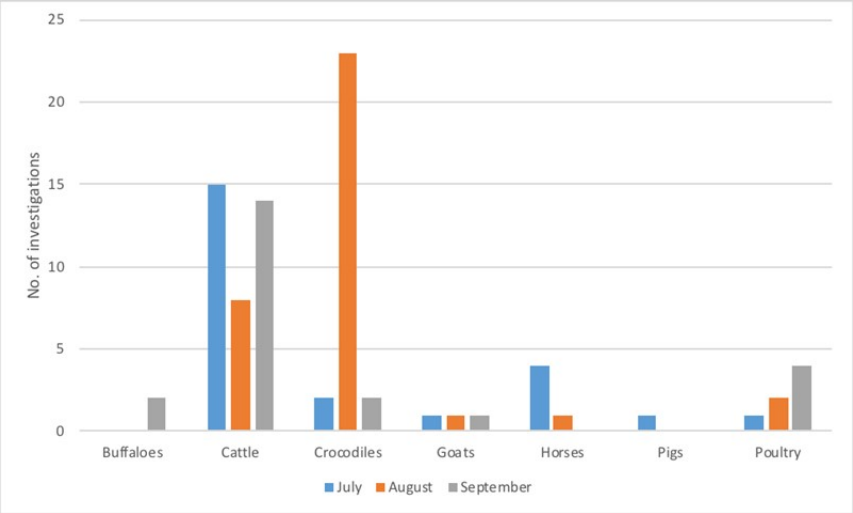
Livestock disease investigations

The department 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 diseases for all disease investigations, and subsidies are available for producers to contact private veterinarians for significant disease investigations in livestock.

During July to September 2018, 83 livestock disease investigations were conducted to rule out emergency diseases or investigate suspect notifiable diseases across the NT.

Tick fever in bulls in a holding yard

A large group of age-cull bulls from multiple properties were being held in a holding yard in the cattle tick-infected zone prior to sale during June and July. Over this period, the manager noticed some bulls had diarrhoea, and seemed tucked up and lethargic before showing an uncoordinated gait and tremors. The manager became concerned when a number of these bulls died, and contacted the government who attended the property the same day to conduct autopsies.

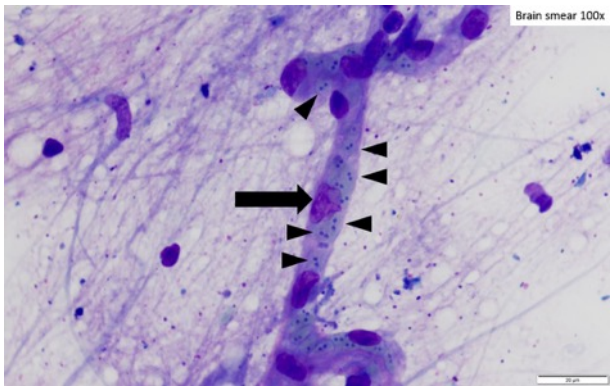


Livestock disease investigations in the NT, July to September 2018

A private and a government veterinarian conducted autopsies on two bulls from two consignments. One bull had died more than 12 hours previously. The carcase was severely decomposed, making it difficult to interpret cause of death. A full range of samples were collected and submitted to the laboratory as the first case. The autopsy on the second bull a week later showed mild jaundice, port wine-coloured urine and haemorrhages on a number of mucosal surfaces. There were small fragments of ironwood leaves in the rumen content.

Laboratory testing of the decomposed bull showed no explanation for any of the signs noted. Referral testing was performed on brain and kidney samples and was positive for Babesia bovis (B bovis) and B. bigemina. Tick fever was suspected but could not be confirmed due to the lack of findings given the decomposed state of the carcase. Test results for the second case revealed significant parasitism with B. bovis, confirming a diagnosis of babesiosis. Due to the neurological signs seen before death, transmissible spongiform encephalopathy (TSE) was excluded in both bulls.

Babesiosis or 'tick fever' is a disease of cattle caused by blood parasites that are transmitted by the cattle tick. On further questioning it became apparent that the bulls affected had originated in a cattle tick-free zone and not been treated for ticks before moving to a holding property, which was in a tick-infested zone.



A blood vessel containing red blood cells and basophilic intra-erythrocytic pear-shaped organisms consistent in size and shape with Babesia bovis. Arrow heads point to blood cells containing organisms.

Cattle born and raised in areas where cattle ticks are endemic can develop natural immunity through exposure to ticks infected with tick fever. Cattle raised in areas free from cattle ticks are at risk of tick fever if introduced into areas where ticks are present. The bulls were vaccinated ('blooded') as young bulls. Juvenile bull vaccination is no guarantee of life-long protection against the tick fevers. Other classes of cattle did not show any apparent disease which may be due to their genetics or some less apparent factor.

In this case, management advice was given to treat and remove ticks from affected cattle and there were no further losses. The property where the bulls had originated was also given advice to ensure that any at-risk cattle are blooded (vaccinated for tick fever) prior to moving them into the tick zone in the future.

The Golden Calf: suspected novel metabolic storage disease in a Brahman heifer.

Megan Pickering, Katherine Region Veterinary Officer, DPIR.

Golden calf

This report describes the findings in an approximately six month old Brahman heifer calf from a property near Katherine, with progressive nervous system signs. The calf first came to the attention of the producer at around two months of age when she presented at mustering with an odd coat colouring; this was reported as appearing golden and abnormally shiny. The golden coat faded progressively with age, but was still partly visible on the inner surfaces of the limbs at six months. The calf was recognised as a poor doer, and was brought into the house paddock with the dam for supplemental feeding and monitoring. Poor weight gain persisted, despite this intervention. Over the next four months, the calf was noted in the yard to have increasing difficulty rising, developed a staggering gait and was seen to "plait" the hind limbs. When veterinary investigation was requested, the calf was unable to stand without assistance, and in poor condition despite intense supplementary feeding over the preceding several weeks. The calf was euthanised on humane grounds and a full post-mortem performed.

There are a number of established inherited nervous system diseases in young cattle. In cases where disease results from a genetic fault – also known as an inborn error of metabolism - chemicals that are by-products of normal metabolic processes build up, and are not removed, because cells cannot produce an essential enzyme. Although such faults often occur widely across different cell types in the body, most of the visible abnormalities are due to effects on the brain and spinal cord. Affected animals are typically normal at birth, but begin to show signs of nervous system disease in the first weeks or months of life.

In this calf, apart from a lack of body fat, there were no abnormalities that could be seen with the naked eye during the post mortem. Laboratory examination of the tissues, however, showed that the calf had severely abnormal fluid regulation in the brain and spinal cord, leading to electrolyte imbalances and swelling in the cells. Swelling of brain cells for any reason is likely to progress to early death of the affected animal, either through progressive damage to the brain and lack of ability to perform basic functions (eating, drinking, standing and walking) or death from misadventure, secondary to disability. Tests performed on other tissues and blood were essentially normal.

In northern Australia, beef herds are dominated by Brahman, Brahman cross and Shorthorn breeds, in which Pompe's Disease, or Generalised Glycogenosis2, has been documented. Affected calves have difficulty rising, lose condition and typically die by six to 12 months of age. Also known to be heritable in Brahman cattle is Congenital Myasthenic Syndrome4; affected calves are normal at birth, but become progressively weak over the first week of life and are generally destroyed within a few weeks.

Inherited metabolic storage diseases described in cattle breeds other than the Brahman include:

- alpha-mannosidosis (Angus, Murray Grey, Simmental, Galloway, Holstein)
- neuronal lipodystrophy (Angus, Beefmaster)
- citrullinaemia (Friesians)
- shaker calf syndrome (Hereford)
- maple syrup urine disease (Hereford, Shorthorn)
- neuraxial oedema (Hereford, Hereford-Friesian X).

The course of the disease and the examination of tissues in this case, however, is not consistent with any of these well-described inherited nervous system diseases, and is also inconsistent with bovine spongiform encephalopathy (mad cow disease).

Therefore, this case is either the result of a random genetic fault or may prove to be a new disease. We would be very interested to investigate any cases of nervous system disease, particularly in young cattle. The "golden" coat colouring is interesting and may perhaps be a visible signpost for identifying future cases.

For more information go to the Merck Manual Website[12].

Further reading

Aust Vet J. 1981 May;57(5):227-9.Generalised glycogenosis in Brahman cattle.

O'Sullivan BM, Healy PJ, Fraser IR, Nieper RE, Whittle RJ, Sewell CA

Aust Vet J. 1989 Feb;66(2):46-9. Maple syrup urine disease in calves: a clinical, pathological and biochemical study. Harper PA1, Dennis JA, Healy PJ, Brown GK.

Thompson, P.N. et al 1998: Congenital myasthenic syndrome of Brahman cattle in South Africa, Veterinary Record 143:526-529

Emergency Animal Disease Symposium highlights

The 5th Annual Emergency Animal Disease Symposium was held at the Australian Animal Health Laboratory, Geelong, on 17 and 18 October 2018 with more than 100 attendees over the two days. The following are a few highlights from the symposium which was important not only for updating participants in the latest trends in EAD research, but also for the face-to-face networking opportunity for EAD prevention between colleagues and livestock industry participants.

Dr Debbie Eagles highlighted recent trends in vector borne diseases and reminded participants that global warming was likely to have a major effect on vector borne diseases such as Bluetongue. The maintenance of the sentinel herd programs and vector collection in northern Australia is an essential component of our early warning system for transboundary disease incursions.

Dr Cameron Stewart gave a very informative presentation on emerging approaches to disease diagnosis. Recent work on microRNAs in Hendra and mastitis in cattle had produced encouraging results in the early detection of Hendra and mastitis in cattle that could be made before the onset of clinical signs.

[12] https://www.merckvetmanual.com/metabolic-disorders/metabolic-disorders-introduction/metabolic-storage-disorders-and-inborn-errors-of-metabolism

Dr Jeff Hammond updated the symposium participants on Foot and Mouth Disease. There was marked long distance spread of the virus, especially from India, with the movement of people as a significant feature. This eastern spread of the virus from India was perceived as a major threat to Australia and constant vigilance was necessary to prevent an incursion of this virus.

Dr David Williams described the situation with African Swine Fever (ASF), which is a serious threat to Australia's pig industry especially if introduced into the estimated 20 million feral pigs in Australia. The southward movement of ASF from China through direct and indirect transmission by people, was a major concern. NT Livestock Biosecurity efforts have focused on ASF awareness in 2018.

Bucks for Brains

Do you have cattle that are displaying any of the following signs:

- changes in behaviour and neurological signs
- excessive licking of the nose and flanks
- poor coordination (circling, staggering and falling)
- muscle tremors
- abnormal posture (abnormal ear position and abnormal head carriage)
- difficulty in rising (downer)
- paralysis
- excitability
- increased or decreased sensitivity to sound, pain, heat, cold or touch

If you do, you may be eligible for an incentive payment under the 'Bucks for Brains' initiative.

Bucks for Brains is an initiative of the National Transmissible Spongiform Encephalopathies Surveillance Project (NTSESP) run through Animal Health Australia. Transmissible spongiform encephalopathies are rare, fatal diseases that cause gradual deterioration in the brain and other central nervous system tissues. Bovine spongiform encephalopathy (BSE), commonly known as 'Mad Cow' disease is the form found in cattle. Scrapie is the form found in sheep.

The NTSESP helps Australia meet guidelines set by the World Organisation for Animal Health to demonstrate Australia's freedom from BSE and scrapie. To ensure that these guidelines are met, Australia must continue to collect, examine and test eligible cattle and sheep samples.

The clinical signs of BSE can be common to many other diseases, which is why specific testing is required.

The program provides payments to producers who submit eligible cattle brains for national testing. Producers receive $300 per eligible cattle submission, for a maximum of two animals per veterinary investigation.

Eligible cattle need to meet the following criteria:

- be older than 30 months
- be less than nine years
- display signs consistent with BSE (listed above).

Please contact your Regional Field Veterinary Officer or Livestock Biosecurity Officer if you have cattle displaying any of the signs.

Source: Animal Health Australia 2016, Bucks for Brains,[13] Animal Health Australia, accessed 20 November 2018,

2018 Audit of NT Brands Register

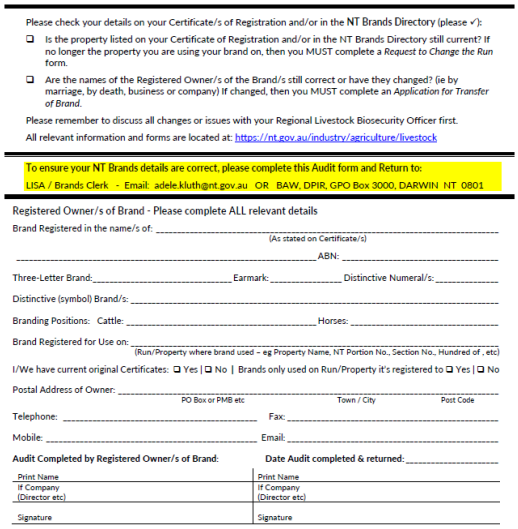
Livestock Biosecurity Branch - Commenced July – ongoing

2018 Audit paperwork has been sent out to Registered Owner/s of NT Brands, to the last known address listed in the NT Brands Register.

If you have NOT, received the 2018 Audit form please advise via Email adele.kluth@nt.gov.au so that the Audit form can be emailed to you ASAP.

If you have received the 2018 Audit form please ensure you complete all the sections, sign and date, then return form for processing ASAP.

YES even if your details have NOT changed, you still need to complete the Audit form and return it for processing ASAP.



Please check your details on your Certificate/s of Registration and/or in the NT Brands Directory (please ✓):

- ❑ Is the property listed on your Certificate of Registration and/or in the NT Brands Directory still current? If no longer the property you are using your brand on, then you MUST complete a *Request to Change the Run* form.
- ❑ Are the names of the Registered Owner/s of the Brand/s still correct or have they changed? (ie by marriage, by death, business or company) If changed, then you MUST complete an *Application for Transfer of Brand*.

Please remember to discuss all changes or issues with your Regional Livestock Biosecurity Officer first.

All relevant information and forms are located at: https://nt.gov.au/industry/agriculture/livestock

To ensure your NT Brands details are correct, please complete this Audit form and Return to:
LISA / Brands Clerk - Email: adele.kluth@nt.gov.au OR BAW, DPIR, GPO Box 3000, DARWIN NT 0801

Registered Owner/s of Brand - Please complete ALL relevant details

Brand Registered in the name/s of: _____ (As stated on Certificate/s)

_____ ABN: _____

Three-Letter Brand: _____ Earmark: _____ Distinctive Numeral/s: _____

Distinctive (symbol) Brand/s: _____

Branding Positions: Cattle: _____ Horses: _____

Brand Registered for Use on: _____ (Run/Property where brand used – eg Property Name, NT Portion No., Section No., Hundred of , etc)

I/We have current original Certificates: ❑ Yes | ❑ No | Brands only used on Run/Property it's registered to ❑ Yes | ❑ No

Postal Address of Owner: _____ PO Box or PMB etc / Town / City / Post Code

Telephone: _____ Fax: _____

Mobile: _____ Email: _____

Audit Completed by Registered Owner/s of Brand: **Date Audit completed & returned:** _____

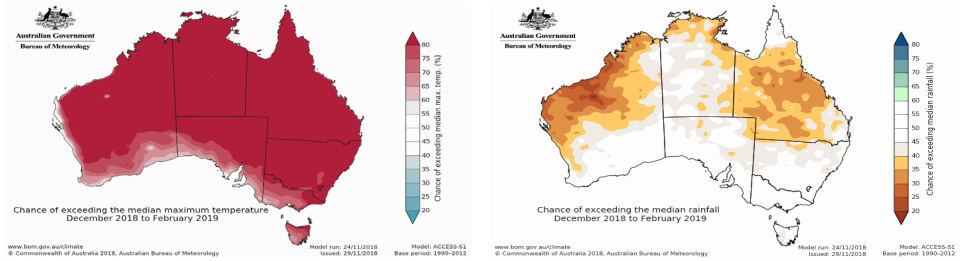
Print Name If Company (Director etc)	Print Name If Company (Director etc)
Signature	Signature

E: adele.kluth@nt.gov.au OR Fax: 8999 2089 OR Brands Clerk, GPO Box 3000, Darwin NT 0801

BOM three month climate forecast summary

The Bureau of Meteorology (BOM) releases monthly climate outlooks, and videos on their website every three months. Go to their website for their video on climate and water outlooks December to February 2019[14].

The outlook for Australia is for hotter than average temperatures over the next three months. For parts of the NT (including the Top End), WA and Queensland it is likely to be drier than average as shown in figure below.



Chance of hotter than average temperatures (left) and rainfall (right) from December 2018 to February 2019. Source Australian Bureau of Meteorology[15]

There is continued development towards an El Niño in the year ahead with outlook remaining on an El Niño alert. For more information on the ENSO (El Niño –Southern Oscilation) system and what it means visit the BOM ENSO Wrap Up page.

[13] www.animalhealthaustralia.com.au/wp-content/uploads/2015/11/Bucks-for-Brains_Jun16_WEB.pdf
[14] http://www.bom.gov.au/climate/outlooks/#/overview/video
[15] http://www.bom.gov.au/climate/ahead/outlooks/

Remote communities get connected

More Territorians in remote areas now have access to mobile and broadband services thanks to the NT Government/Telstra Remote Telecommunications Co-Investment Program.

The program, which began in 2015, has seen 14 remote communities receive mobile and/or broadband connectivity, most recently Mt Liebig, Kintore and Yarralin.

The services at Mt Liebig have been connected through a joint venture between the NT Government/Telstra Co-investment Program and the Australian Government's Mobile Black Spot Program.

The next communities scheduled to receive services under the Co-investment Program are Atitjere, Alpurrurulam and Belyuen and are expected to be completed by mid-2019.

For more information read the NT Government media release[16].

Quick Poll

Are you a melon or mango grower? ☐ Yes ☐ No

What month(s) would you prefer workshops be held?

☐Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec

Calendar of events

NT DPIR Christmas closures	Visit the department's website to view details
12th Annual Australian Mango Conference	May 13 2019, Darwin
Australian Banana Industry Congress	May 21 2019, Gold Coast
Hort Connections 2019	June 23 2019, Melbourne

[16] http://newsroom.nt.gov.au/mediaRelease/28486

Keep up to date with the latest information from the NT Department of Primary Industry and Resources

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:

dpir.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.

Contact us:

Website: www.dpir.nt.gov.au
YouTube: www.dpif.nt.gov.au/youtube
Email: horticulture@nt.gov.au