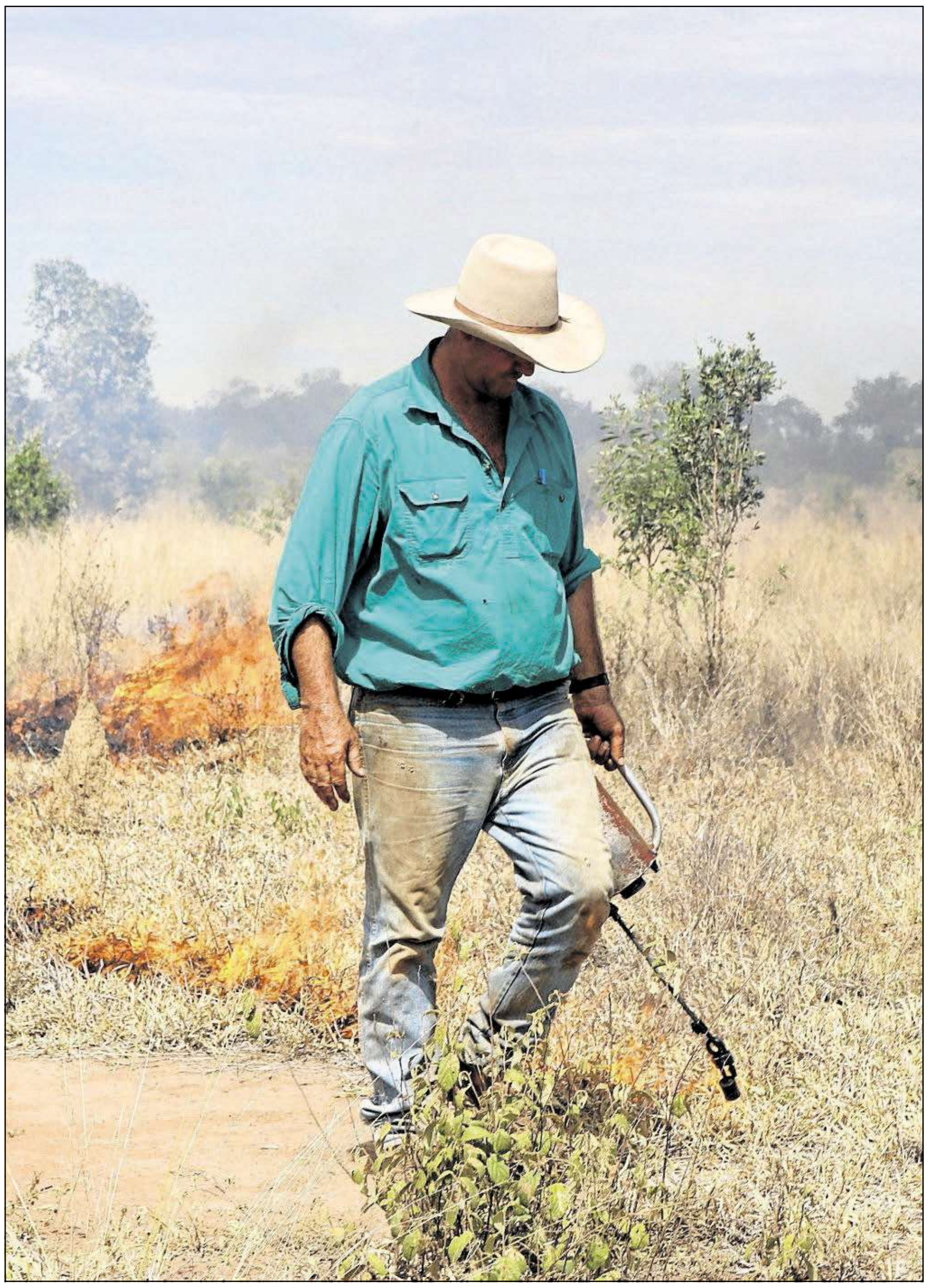
FutureBeef **NORTHERN MUSTER** *Information for rural business in North Queensland* Queensland Government

Use of fire as an affordable control option



Fire is the most affordable control option available to beef producers in the northern forest country.

HEALTHY savannah woodlands are a valuable resource for the northern Dry Tropics and healthy productive native pastures are essential for a profitable grazing industry in the region.

Woody vegetation has been thickening across the region over the last 50 years, and in combination with exotic woody weeds, has negatively impacted pasture growth and animal productivity, while mustering time and costs have increased.

The most common exotic and native species associated with weed invasion and thickening across the northern rangeland include lantana, rubbervine, breadfruit, gutta percha, yellow wood, wattle, tea tree, currant bush, Cooktown ironwood and native eucalypt species.

Fire is the most affordable control option available to beef producers in the northern forest country.

Important tips for landholders to maximise the benefits of using fire, include:

- Identifying the problem woody species and its susceptibility to fire. Problem species under three metres are more susceptible to fire damage.
- Assessing whether fire will improve the situation and what fire frequency is needed to address the thickening or weed problem, and then develop a burning strategy to be applied over several years.
- Accumulating adequate fuel loads of 1000-1500kg/ha, which is the minimum pasture yield required for an effective fire. This will require the paddock to be wet season spelled or lightly stocked in the season prior to burning.
- Burn at the end of the dry season after the first storms (30-50mm ideal).
- Burning conditions on the day of the fire are vital for a good result. A hot afternoon with some breeze is ideal while fire breaks and back burning are essential for containing the fire.
- Don't introduce cattle back onto the burnt area until the native pastures have regrown and seeded (usually around April in most years). Stocking a paddock in the wet season immediately after a fire can cause severe setbacks in pasture recovery.
- Don't burn after Christmas or in El Nino years where the expectation of good summer rain is lower.

Exotic and native species are listed below in order of fire susceptibility (1= highly susceptible to fire; 10= resistant to fire).

Rubbervine (1), Gutta percha (2) Breadfruit (3) Lantana (4) Wattles (5) Yellow wood (6) Current bush (7) Tea tree (8) Cooktown ironwood (9) Native eucalyptus species (10).

Breedcow and Dynama herd budgeting tools are available at breedcowdynama.com.au.

Herd budgeting tool online

THE Breedcow and Dynama herd budgeting suite of tools are now available online.

Developed by Bill Holmes from the now Queensland Department of Agriculture and Fisheries (DAF) in 1988, the program was designed for graziers and advisers.

"There have been six major updates to this herd budgeting tool since it was developed and this year we have moved the program online," DAF grazing economist Tim Moravek said.

The program allows graziers to understand the economic impacts of decisions they make in their beef cattle enterprise, whether it is trading cattle, production feeding or investing in infrastructure.

"Improved usability, information sharing and help guides are included and the online tool improves the ability to be helped remotely by agricultural economists based in regional Queensland."

Online training courses and workshops are planned for the end of the year, call 13 25 23.

Giving nitrogen a boost

Biocrusts are the 'living skin' on the surface of the soil and are made of many tiny organisms including cyanobacteria, fungi, green algae, bacteria, lichens, liverworts, and mosses.

RESEARCHERS at The University of Queensland are investigating how fire and grazing can be managed to optimise nitrogen inputs by biocrusts to improve the productivity of grazing lands in northern Australia.

In the research - funded by Meat & Livestock Australia - biocrusts are being put through their paces at the Kidman Springs fire experiment 400 kilometres south of Darwin (NT Department of Primary Industry and Resources) and the Wambiana Grazing Trial in north Queensland (QLD Department of Agriculture and Fisheries).

What are biocrusts?

Biocrusts are the 'living skin' on the surface of the soil and are made of many tiny organisms including cyanobacteria, fungi, green algae, bacteria, lichens, liverworts, and mosses.

They grow when it's wet or dewy and become inactive when it's dry, just like plants.

Why do we care about biocrusts?

They stabilise the soil surface by intertwining with soil particles to bind them together, preventing erosion from wind and water.

They photosynthesise and fix carbon - algae, cyanobacteria, lichens, liverworts, and mosses are all green and photosynthesise just like plants.

The carbon they pull out of the air is incorporated into the soil and enhances soil carbon.

They fix nitrogen! Most cyanobacteria fix nitrogen out of the air just like legumes do. They use the nitrogen to grow but store any excess nitrogen they fix in a slimy layer around their cells.

When it rains, much of this plant-available nitrogen enters the surrounding soil and is available for pastures.

In the dry season the biocrusts dry out and partly disintegrate.

This nutrient-rich biocrust is incorporated into the soil as organic matter with early wet season rains.

The amount of nitrogen that biocrusts fix every year is similar to the amount of nitrogen fixed by native legumes in our grassy tropical savannas.

Soil fertility is a major limitation to pasture growth in tropical savannas, but it doesn't pay to add fertilisers at these extensive scales.

We are testing if we can manage grazing and fire to maximise the natural carbon and nitrogen inputs by biocrusts into soils and enhance soil fertility and productivity in tropical savannas.

> **BIOCRUSTS**
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> - Biocrusts cover 12 per cent of the earth's land surface and fix 7pc of the terrestrial carbon and 45pc of the plant-available nitrogen.
> - At Kidman Springs in the Victoria River District and Wambiana at Charters Towers, up to 70pc of the ground cover is biocrusts.
> - Savanna grasses have higher growth with biocrusts, probably because they benefit from the extra nitrogen fixed by the biocrusts.

Where are biocrusts?

They are in the top one to two centimetres of the soil, usually covering the bare ground spaces between plants.

Biocrusts are found all over the world from freezing Iceland and Antarctica to hot deserts and savannas.

In tropical savannas biocrusts are dominated by cyanobacteria and liverworts.

What do they look like?

In Northern Australia biocrusts often appear as dark staining on the soil surface in the dry season (top left) and dark green slimy films during the wet season (top right).

But wait, aren't soil crusts a bad thing?

There are two types of soil crusts. Living biocrusts are distinct from dead physical crusts that form on degraded soils.

Physical soil crusts can inhibit water infiltration and plant growth.

Living biocrusts enhance soil moisture, soil fertility and plant growth.

What effect do fire and grazing have on biocrusts?

Fire can enhance biocrusts by removing litter, trees and shrubs that would otherwise compete as ground cover, yet you need the right amount of fire; not too much, not too little.

Biocrusts in Australia's tropical savannas, like our native vegetation, have evolved with fire and hence are well adapted to fire.

Biocrusts from Kidman Springs regrew just as well after fire as unburnt sites.

During the wet season burnt biocrusts on alluvial soils grew faster than unburnt biocrusts.

Grazing can also potentially open spaces for biocrusts by reducing plant cover, nevertheless, the trampling by hooved animals is not something Australian ecosystems have evolved with, so our biocrusts are quite susceptible to heavy trampling.

At the Wambiana Grazing Trial near Charters Towers, biocrust cover was higher and healthier with moderate grazing than with heavy grazing.

How can we manage grazing to benefit biocrusts?

During the dry season biocrusts dehydrate and become dormant.

The carbon and nitrogen they fix is broken down and recycled by other critters in the biocrust, and then becomes incorporated into the soil and available to plants.

We suspect that spelling over the wet season while biocrusts are actively growing and grazing during the dry season when they are dormant, will not only benefit palatable plants, but also biocrusts, allowing them to maximise their growth and nitrogen fixation.

To find out more visit futurebeef.com.au (search for 'biocrust').

- Robyn Cowley, Northern Territory Department of Primary Industry and Resources, 0419 829 493.
- Wendy Williams, The University of Queensland, 0418 246 001.

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Focusing on pasture dieback


DAF staff undertaking soil and plant sampling during March 2020 for pasture dieback research.

PASTURE dieback has caused significant productivity losses over recent years.

Early 2020 rain improved pasture conditions but unfortunately dieback is still present in previous and new locations.

Due to the economic impact of this condition, the Queensland Department of Agriculture and Fisheries (DAF) has an active program of activities to assist graziers.

Characterisation of the condition across Queensland has been valuable to determine the impacts of dieback, map its presence and to better understand factors that might predispose pastures. This work indicates that millions of hectares may be affected.

Rigorous diagnostic research into the causes of dieback continues. The scientific team is investigating whether fungi, bacteria, viruses, insects or a combination of these, are causing dieback. At this stage it's unlikely dieback is caused by fungal organisms. A range of fungi have been detected but haven't caused plant death in multiple research investigations. DAF is investigating the involvement of viruses, bacteria or phytoplasmas.

The role pasture mealybug may have in dieback is a key focus of DAF research. For mealybug to be the direct cause of dieback, infested plants need to express the full cycle of symptoms; leaf yellowing and/or reddening, stunting of growth, early senescence and death.

Several grass species infested with pasture mealybugs in controlled glasshouse experiments (in the absence of other pathogenic organisms) showed dieback-like symptoms but failed to die. This indicates mealybugs are not the direct or sole cause of dieback under these conditions. Further research will be conducted.

Trials investigating management options to restore productivity are continuing. Work at Brian Pastures Research Station, Gayndah demonstrated that sowing legumes (annual or perennial) into affected paddocks can restore forage availability. Sorghum or oats haven't been affected by dieback.

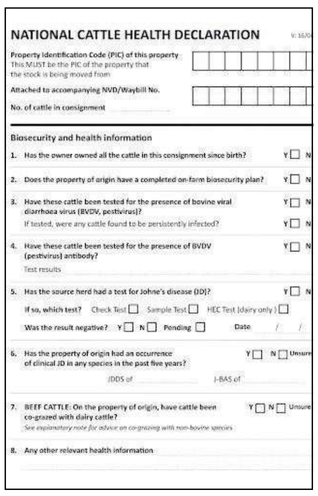
There is variability in grass species tolerance to dieback, however, it's uncertain if any species are resistant. In February 2020, a new field site was planted near Kalbar, southern Queensland with 26 different grass species. Another site is being sought in Central Queensland.

The DAF pasture dieback project will continue to seek answers to these questions: What is the cause? What can be done about it? What can be done to stop pastures being affected?

We have working relationships with organisations undertaking complementary research, including MLA (and partners), The University of Queensland, Central Queensland University and Fitzroy Basin Association.

Nick Brazier, pasture agronomist, DAF Rockhampton, 07 4843 2631.

DECLARING IS CARING: NEW CATTLE HEALTH DECLARATION NOW AVAILABLE


NATIONAL CATTLE HEALTH DECLARATION

Property Identification Code (PIC) of this property
This MUST be the PIC of the property that the stock is being moved from

Attached to accompanying NVD/Waybill No.

No. of cattle in consignment

Biosecurity and health information

1. Has the owner owned all the cattle in this consignment since birth? Y N
2. Does the property of origin have a completed on-farm biosecurity plan? Y N
3. Have these cattle been tested for the presence of bovine viral diarrhoea virus (BVDV, pestivirus)? Y N
   If tested, were any cattle found to be persistently infected? Y N
4. Have these cattle been tested for the presence of BVDV (pestivirus) antibody? Y N
   Test results
5. Has the source herd had a test for Johne's disease (JD)? Y N
   If so, which test? Check Test Sample Test HEC Test (dairy only)
   Was the result negative? Y N Pending Date / /
6. Has the property of origin had an occurrence of clinical JD in any species in the past five years? Y N Unsure
   JDDS of J-BAS of
7. BEEF CATTLE: On the property of origin, have cattle been co-grazed with dairy cattle? Y N Unsure
   See explanatory note for advice on co-grazing with non-bovine species
8. Any other relevant health information

ONE of the most important biosecurity tools has been updated, with a new version of the national Cattle Health Declaration now available.

The declaration is designed to capture important information about the health of a mob of cattle at the time they are sold, assisting the buyer in managing their introduction to the property and their integration into a new herd.

Effective disease management depends on animals getting their initial vaccinations and annual booster doses at the correct time. Disease problems often occur with bought animals due to confusion over their vaccination status.

"The declaration has sections on current vaccinations and treatment history," Dr Rob Barwell, senior manager biosecurity at Animal Health Australia explained.

"This lets you see a more complete picture of how the health of the cattle has been managed by their current owner prior to sale, and how you should proceed with their health management into the future."

The declaration is available at farmbiosecurity.com.au, as part of the resources found under both 'Beef Cattle' and 'Dairy Cattle' tabs.

It's available as both a printable and fillable form, meaning producers can print as many copies as they need, or save a digital version with some key information already filled in.

"While the Cattle Health Declaration is a voluntary document, we highly recommend you request one whenever you buy cattle, and provide one when selling them," Dr Barwell said.

"To that end we've made it as easy as possible to access, fill in and hand over when the sale is complete."

New cattle health declaration

- The declaration provides important information about the health of cattle when they are sold.
- Current vaccination status and treatment history are provided.
- The declaration is available in both printable and fillable format.
- Declaration available at farmbiosecurity.com.au.