FutureBeef BEEFTALK Taking stock of your future
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NORTHERN TERRITORY GOVERNMENT · Department of Primary Industries and Regional Development, Government of Western Australia · mla Meat & Livestock Australia · Queensland Government

Giving nitrogen a boost

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).

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.

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

- 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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Protect cattle from lead poisoning

LEAD poisoning continues to remain a common cause of cattle death.

Animals may find material contaminated with lead in silage, rubbish dumps and around farm buildings and machinery.

Lead can be present in:

- discarded sump oil and oil filters
- lead batteries
- flaking lead-based paint or old paint tins
- lead shot and fishing sinkers
- linoleum, grease, putty, metallic lead.

Discarded batteries are the most common cause of lead toxicity in cattle.

Battery cases become brittle over time and are easily broken by inquisitive cattle.

The lead and lead salts that they contain are easily accessed and readily licked or eaten by stock.

Animals are likely to seek out sweet-tasting lead compounds if they are bored from being confined or have changed appetites from malnutrition or phosphorus deficiency.

Cattle are at most risk of lead poisoning because they are inquisitive and commonly 'taste test' new finds including old batteries, flaking lead paint, sump oil, ashes and just about any other potential lead source they find.

Lead poisoning risks can increase during drought.

Hungry stock may develop a depraved appetite, particularly if also suffering trace element or mineral deficiencies.

Hungry stock are also more inclined to break into 'no-go' areas, such as around farm sheds or the farm rubbish tip where there is some residual feed, or where stock may be held in house paddocks to make feeding easier.

Less pasture cover makes it more likely that stock will find hazards such as old batteries.

The easiest and most effective way to protect your production animals from lead poisoning and contamination is to dispose of lead safely.

Never dispose of toxic waste in general rubbish dumps or bins.

Local councils usually provide options for toxic waste disposal.

Local garages may dispose of sump oil and car batteries for you, and some scrap metal merchants will purchase lead batteries.

If you suspect your animals have been exposed to lead, contact your local biosecurity officer and seek veterinary advice immediately.

More detailed information about the signs of lead poisoning in cattle can be found at shorturl.at/dnyOT.

Megan Gurnett, Department of Agriculture and Fisheries, Toowoomba (07) 4529 4221 megan.gurnett@daf.qld.gov.au

Cattle are at most risk of lead poisoning because they are inquisitive and commonly 'taste test' new finds - including old batteries, flaking lead paint, sump oil and ashes.

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.

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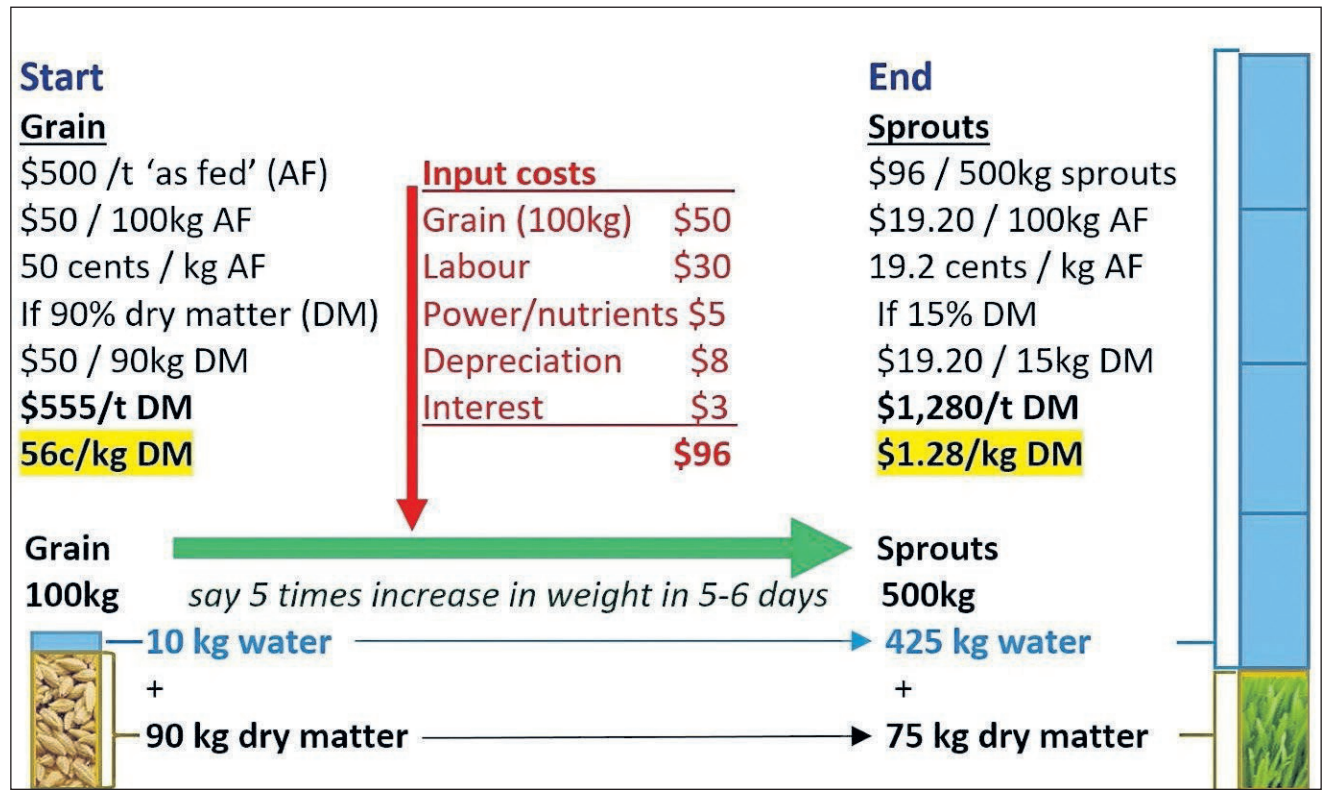
Compare feed options

Barley sprouts can prove costly



Example of changes in dry matter, water and costs with sprouting barley grain.

A RANGE of commercial hydroponic systems are marketed in Australia for sprouting cereal grains for livestock production.

For those not familiar with hydroponic fodder systems, they are used to produce sprouts by soaking grain, most commonly barley, in water until fully saturated, followed by draining and placing into trays or troughs for sprouting, usually for five to eight days.

The grain is kept moist during this period. Grain is often soaked or washed with a sterilising solution to help minimise the risk of mould.

The yield and quality of sprouts produced is influenced by many factors such as soaking time, grain quality, grain variety and treatments, temperature, humidity, nutrient supply, depth and density of grain in troughs and the incidence of mould.

To achieve maximum yield and nutritional benefits of sprouts the grain should be clean, sound, free from broken or infested seeds, untreated and viable.

At harvest, the barley shoots will be about six inches tall with a two inch mat of interwoven roots.

The sprouted grain is harvested by removing the tray or sliding the mat off the tray in one long sheet. The mats can be cut to the appropriate size and fed to cattle.

High moisture lush green sprouts may seem an attractive feed alternative, particularly during drought, however, it is important to consider the costs involved.

While the idea of turning 1 kilogram of grain into 5-6kg of lush sprouts in a week sounds appealing, the extra weight is mostly water and it can be costly.

To compare feed options, it is important to account for water content and dry matter, particularly if considering high moisture feeds.

For example, if lush sprouts were 10 cents a kilogram, this is 10 cents per 1000 grams of sprouts.

If sprouts are 88 per cent water, then 1kg of sprouts equals 880g water plus 120g dry matter.

This means it is 10c/120 grams of dry matter (DM), or 83c/1kg DM or $833/tonne DM.

High-quality hay, protein meals, pellets and feedlot rations are usually cheaper.

On a dry matter basis the energy and protein of the sprouts will be similar to a feedlot ration or pellets and slightly higher than high quality hay.

Protein meals have similar energy to sprouts and higher protein levels. On an "as fed" basis (including the water) sprouts are the lowest in energy.

The diagram demonstrates changes in the water and dry matter content in the original barley grain compared to the lush sprouts.

Grain is about 90pc dry matter (10pc water) while week old hydroponically sprouted barley maybe 10-15pc dry matter (85-90pc water). For example, 10kg of "as fed" sprouts is 8.5 to 9kg water.

To germinate, the seed uses its starch energy reserves to grow roots and shoots and the shoots are not old enough to regain significant carbon using photosynthesis.

As a result of using its own energy and protein reserves to grow there is less dry matter and energy in the sprouts than the original grain.

Other considerations in sprouting grain for cattle includes time, labour, capital, mould and sourcing high germination grain.

Sprouting grain takes several hours work each day and the high water content means handling and shifting lots of water in the form of sprouts.

Sprouting infrastructure ties up money and interest on money that could be earning dollars elsewhere or reducing a loan.

Mould can become a major problem.

Very good hygiene and often the use of chlorine chemicals are required to inhibit mould.

If a high percentage of grain does not germinate, it may need to be discarded therefore dramatically increasing costs.

Sourcing high germination percentage barley, especially during drought, can become significantly more expensive than buying high quality hay, pellets or grain rations.

Whenever possible review scientific and peer reviewed trial data and do your own sums with realistic figures.

Overall it is best to plan stock feed requirements and supplementation needs well ahead.

To minimise the need for feeding, assess pasture yield in autumn and move early to adjust stock numbers to match so that there will still be good "rain ready" pasture stubble cover in the paddock ready for next summer rain.

For more information on comparing feed options you can contact your local beef extension officer.

Contact details can be found at futurebeef.com.au/contact-us/ or alternatively by calling the Department of Agriculture and Fisheries customer service centre on 13 25 23.

By officers of the Department of Agriculture and Fisheries.

Costing dry matter

- Sprouts: 10c/kg as fed; $100/t as fed; 88pc water; 880kg/t water; 120kg/t DM; $833/t DM.
- Sprouts: 19.2c/kg as fed; $192/t as fed; 88pc water; 880kg/t water; 120kg/t DM; $1600/t DM.
- Silage: 10c/kg as fed; $100/t as fed; 70pc water; 700kg/t water; 300kg/t DM; $333/t DM.
- Hay: 45c/kg as fed; $450/t as fed; 12pc water; 120kg/t water; 880kg/t DM; $511/t DM.
- Pellets: 60c/kg as fed; $600/t as fed; 10pc water; 100kg/t water; 900kg/t DM; $667/t DM.
- Protein meal: 70c/kg as fed; $700/t as fed; 10pc water; 100kg/t water; 900kg/t DM; $778/t DM.

Great potential to integrate sheep and lambs

The benefit of diversification

THERE is great potential for farmers in closely settled areas to integrate sheep and lambs into their mixed farming operations, with diversification and effective management key to driving profitability, particularly in drier times.

That's according to Stuart and Pru Barkla, who together manage their 160-hectare property, 'Mt Molar' Clifton, Queensland, where they currently run 130 breeding ewes, 200 goats and a lamb trading enterprise.

"Diversification has been key to the sustainability and profitability of our enterprise, offering a more balanced business and giving us the opportunity to better manage risk," they said.

"Integrating sheep production in our business involved investing in a good set of sheep yards and completely fencing the boundary with an exclusion fence.

Stuart and Pru Barkla, 'Mt Molar' Clifton, say that diversification has been key to the sustainability and profitability of their enterprise.

> Producers looking to get into sheep can learn from Australia's industry experts via the ongoing H Series of webinars featuring information from across sheep and wool production topics.

"Due to consistent dry seasons in our region, our sheep production has enabled us to maintain our business throughout this drought and continue to optimise the use of our land and pasture through rotational grazing in conjunction with supplementary feeding."

The Barklas said management decisions around how to optimise livestock production significantly impact productivity and profitability in mixed farming enterprises.

"You must ensure you have the capacity and strategies in place to mitigate risk of mortality to your livestock, for example protecting your flock from feral animals and dog attacks," they said.

"We participate regularly in 1080 baiting programs, which assists in both the control of feral animals and protects our Australian native animals and birds.

"Although living in these areas provides easy access to assisted feeding and other resources, producers need to look for ways to optimise their business and ensure the safety of livestock, from exclusion fencing to ensuring sheep genetics are suited to the region.

"If you're considering diversifying your enterprise into sheep production, seek professional advice so you have a better understanding of your business's potential, to guide your future management decisions."

Time to take stock of your weaning options

WITH BOM issuing a LaNina watch ,variable summer rain likely and much of Queensland still in drought, livestock producers are urged to maintain flexibility in their businesses and take stock of their management options for weaning lambs.

Milly Nolan, extension officer with the Queensland Department of Agriculture and Fisheries (DAF), said producers need to be aware of management strategies that can be used to minimise stress and in turn, mitigate risk of weight loss, mortalities and tender wool.

"When looking at weaning management options, the live weight of the lamb should be the key consideration, with a higher weight resulting in a greater chance of survival and therefore success," Milly said.

"Early weaning for one, decreases feeding costs through targeted nutrition and allow for greater flexibility in ewe management decision-making and earlier implementation of worm control programs in lambs.

"If early weaning is done in the yards, it can help ensure that lambs are given the best feed, allowing weaning to occur when lambs are at even lighter live weights.

"Compared to traditional methods, yard weaning has shown to minimise lamb weight loss, reduce stress through quicker adaptation to ewe separation, and allow for closer monitoring for flock health."

Leading Sheep has released nine short clips recorded from the 'Weaning in Dry Times' webinar, visit leadingsheep.com.au and search 'weaning in dry times'.

To find out what tools are available to help wool producers manage varying seasonal conditions, contact leadingsheep@daf.qld.gov.au.

Leading Sheep is an important partnership between DAF and Australian Wool Innovation, and is supported by AgForce.