Management of pasture dieback

What is pasture dieback and where does it occur in Queensland?

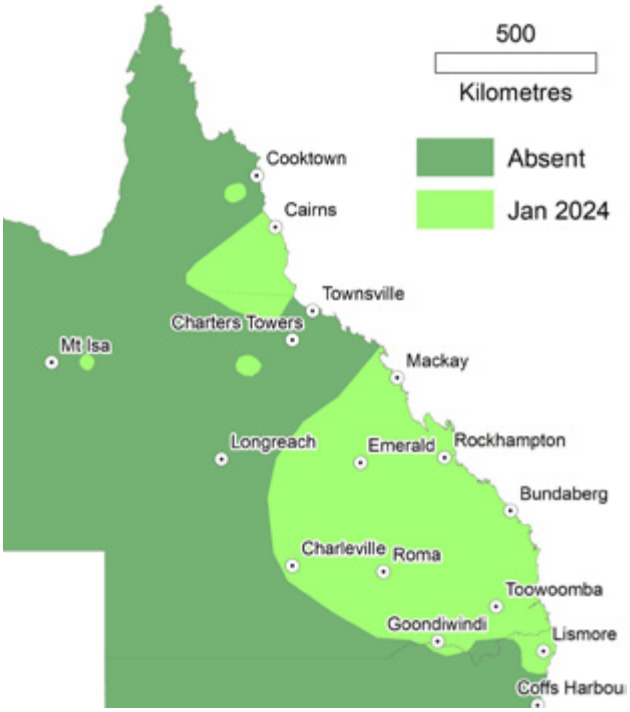
Pasture dieback causes death of otherwise healthy tropical and sub-tropical grass pastures. It affects most high-yielding sown species and some native species, while legumes and other broadleaf plants are unaffected.

Pasture dieback occurs across eastern Queensland and north-eastern New South Wales – generally in areas with more than 600 mm annual rainfall. Pasture death begins in patches but can quickly spread to large areas – or whole paddocks – within one summer season when it is warm and wet.

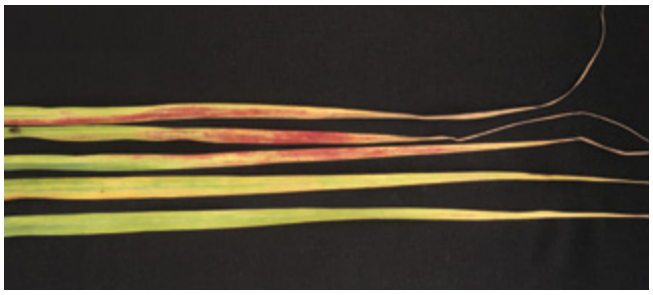
Water and temperature stress, nutrient deficiency and herbicide damage can present similar symptoms to pasture dieback.

Other known pathogens such as fungal infections can also be misdiagnosed as pasture dieback. It is important to exclude these to definitively diagnose this condition. The four stages of pasture dieback symptoms are:

1. Yellowing and/or reddening of individual leaves, starting from the older leaves.
2. Stunted, unthrifty growth of plants in patches – or in severe cases, across whole paddocks – with obvious yellowing and/or reddening of multiple leaves or the whole plant.
3. Death of pasture, in patches or widespread throughout the paddock.
4. Broadleaf plants (legumes or weeds) growing unaffected in areas of dead pasture. Dead pasture plants are grey and can be easily uprooted.



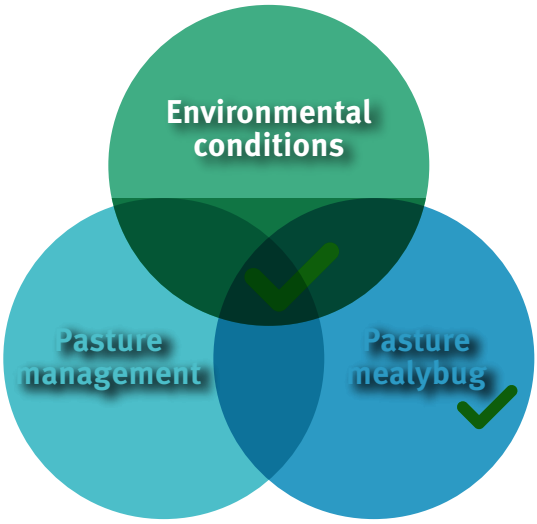
↑ Map of Queensland and northern New South Wales showing (in bright green) areas where dieback has been detected as at January 2024.



↑ Buffel grass leaves showing discolouration.

↑ Pasture mealybugs on a buffel grass leaf.

Recent research indicates the pasture mealybug (*Heliococcus summervillei*) can cause pasture dieback but environmental conditions (water, temperature and nutrient stress) and pasture management practices (species present, grazing strategy) are also contributing factors.



↑ Pasture dieback occurs when pasture mealybugs are present and there are conducive pasture management (large biomass of susceptible species) and environmental conditions (warm and wet).

↑ Dead Bisset creeping bluegrass with broadleaf weeds growing.

↑ Buffel grass showing all four stages of pasture dieback.

Prevention or eradication

There are no confirmed strategies to reliably prevent dieback from affecting grass in pastures. However, two factors can influence the severity:

1. Pasture biomass: lightly or ungrazed areas with continual high pasture yield are more commonly and/or severely affected.
2. Pasture composition: pastures with a diverse mix of legume species and tolerant perennial grasses are commonly only moderately affected.

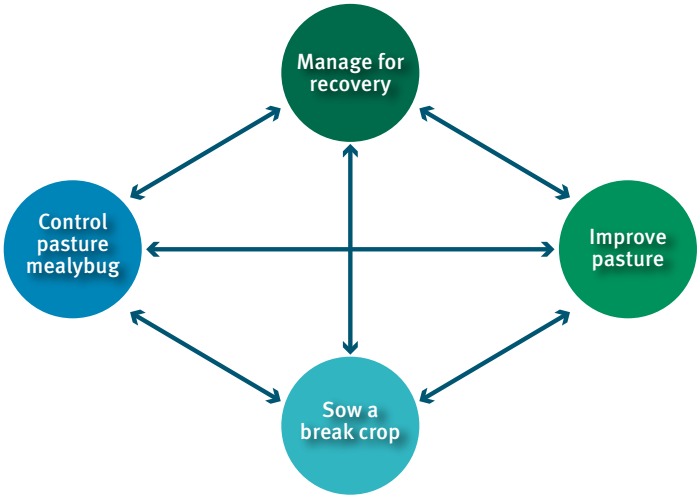
Eradicating pasture dieback by directly targeting pasture mealybugs with insecticides is generally not cost-effective or practical in typical commercial grazing situations.

Therefore, the only feasible option is to manage pasture dieback with grazing and other pasture management practices.

Management strategies

The Department of Agriculture and Fisheries (DAF) and other research organisations have investigated management options for pasture dieback since 2018.

Results from DAF's 10 long-term field trials on commercial properties and experience assisting graziers over many years have been used to develop four management strategies for pasture dieback. These strategies are supported by trial outcomes from other research organisations funded by Meat Livestock Australia (MLA).



↑ Land managers can choose one or multiple strategies to suit their situation. For example, a paddock may be sown to a break crop, then planted to an improved pasture with legumes and tolerant grasses.

1. Manage for recovery

Pastures can recover from dieback by regenerating from existing seeds in the soil. Germinating weed seedlings will compete with pasture seedlings for moisture and nutrients, so controlling weeds in recovering areas can be helpful.

Controlling grazing pressure is also important. Spell recovering areas and wait until pasture seedlings have grown and seeded before allowing access to cattle. Forage budgeting is a useful tool to estimate stocking rate and grazing times. Pastures can recover quickly during wet summers – sometimes within one or two growing seasons.

2. Improve the pasture

Pasture improvement is highly effective in combating pasture dieback. This includes sowing perennial legumes and tolerant grasses, fertilising, renovating, or a combination of these. Renovating the whole pasture through cultivation can break a pathogen cycle and accelerate nutrient cycling, providing a healthier, nutrient-rich environment for new seedlings to thrive in.

Likewise, fertiliser (after a soil test) will supply nutrients to maximise the new pasture's productivity. Planting perennial legumes is essential – they are unaffected by pasture dieback. As pasture dieback reduces or eliminates grass competition, there is an opportunity to easily establish legumes and tolerant grass varieties. Perennial legumes can significantly improve business profitability and there are suitable species for all dieback-affected areas and soil types in Queensland.

↑ Legume-grass pasture sown into dieback-affected country at Moura (one year after sowing, during the wet season).

↑ Legume-grass pasture sown into dieback-affected country at Middlemount (three years after sowing, during the dry season).

↑ The fertilised buffel grass on the left has recovered from dieback better than the unfertilised buffel grass on the right.

3. Sow a break crop

A break crop, such as an annual forage (or grain crop), can be used in arable soils to break an insect cycle and generate short-term feed supply. A forage crop could be grazed, baled or used for silage, depending on the on-farm need and availability of required machinery. The intention is to sow a break crop for one or two years, then return the paddock to a perennial pasture which includes legumes and tolerant grasses.

↑ Forage lab lab or sorghum can be grown as a break crop for grazing.

4. Treat pasture mealybug

This strategy includes spraying an insecticide or using fire to control pasture mealybug. Applying insecticide is generally not cost-effective or practical in commercial situations due to the terrain and equipment needed, and the life cycle and wind dispersal of mealybugs. Insecticide application has not consistently improved yields of all susceptible grass species in DAF field research trials and has a significant impact on all insects in the pasture ecosystem.

Other research trials have strongly demonstrated the effectiveness of beneficial insects that predate on the pasture mealybug. These naturally build up where large populations of mealybugs are present, however, pasture damage has often already occurred.

If spraying an insecticide is considered necessary for pasture mealybug control, consult the Australian Pesticides and Veterinary Medicine Authority (APVMA) for registered products. Burning pastures in spring has produced limited benefits in trials, however, several graziers have anecdotally reported that late wet-season mosaic burns have provided temporary benefits.

Management strategies for pasture dieback affected country based on the size and type of affected area.

Management strategies	Practice	Small patch		Wide patch	
		Arable	Forest	Arable	Forest
Manage for recovery	Adjust stocking rate (forage budget)	✓	✓	✓	✓
	Monitor and treat weeds in bare patches	✓	?	✓	?
Improve pasture	Sow legumes and tolerant grasses	✓	✓	✓	✓
	Apply fertiliser	?	?	✓	?
	Cultivate	?	✗	✓	✗
Sow a break crop	Annual forage (graze or hay/silage)	✗	✗	✓	✗
	Grain	✗	✗	✓	✗
Control pasture mealybug	Spray pesticide	?	✗	✗	✗
	Burn	?	?	?	?

For more information about pasture dieback (including an identification guide, tolerant species selection guide, videos, articles and reports) visit **www.futurebeef.com.au** or call **13 25 23** to speak to your local beef extension officer.

This fact sheet was produced by DAF as part of the Queensland Pasture Resilience Program, a partnership between DAF, MLA and the Australian Government through the MLA Donor Company.

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