How do I...
select grass varieties tolerant to pasture dieback?

MEAT & LIVESTOCK AUSTRALIA

The issue:	Producers face ongoing challenges to maintain healthy and productive pastures to support their livestock operations. A growing concern for the industry is damage caused by pasture mealybug. Its detrimental impacts are significant for pasture production, affecting a variety of pasture species.
The impact:	Mealybug-induced pasture dieback reduces the overall productivity and quality of grazing land. It can lead to significant economic losses.
The opportunity:	By selecting mealybug-tolerant pasture species and implementing best management practices, producers can minimise the impact of pasture dieback on their grazing operations. Best results are obtained when mixtures of legumes and tolerant grasses are planted.

This fact sheet provides research-based knowledge to help producers make informed decisions regarding the relative tolerance and susceptibility of grass pastures to pasture dieback caused by pasture mealybug (*Heliococcus summervillei*) (Figure 1, Figure 2).

The information in this fact sheet summarises current conclusions from various field trials (an example in Figure 3) and glasshouse screening trials. These ongoing trials are evaluating the performance of different pasture species alongside mealybug-induced pasture dieback in a range of growing conditions. Observations by trained pasture agronomists in commercial paddock situations have also been incorporated. As additional data is collected, further updates will be produced.

Field trials and observations in commercial paddock situations have shown that pastures comprised of monocultures are more at risk from the impact of pasture mealybug than diverse pasture mixes, including both a mix of grass species and legumes (Figure 4).

Table 1 provides the relative tolerance levels of each grass species against the pasture mealybug, ranging from tolerant to highly susceptible.

Figure 1: Pasture dieback caused by pasture mealybug on tropical grasses, Note the small size of the mealybug, and purple and yellow streaking of dieback symptoms. Photo Caroline Hauxwell, QUT

Figure 2: Pasture dieback caused by pasture mealybug on tropical grass note purple and yellow streaking of dieback symptoms. Photo DAF

Figure 3: Pasture dieback field trial located near Moura, central Queensland. Photo DAF

This tool can be used to help assess pastures and the risk of mealybug-induced pasture dieback. It can also help select the most appropriate grass species when sowing new pastures into dieback-affected paddocks to improve the longer-term health and productivity of the feedbase.

Observations in pastures in commercial paddock situations have shown some pastures can regenerate without re-seeding. While this has been used as a low-cost strategy by many producers, a more resilient long-term pasture is likely when new pasture is re-established with grasses of higher tolerance combined with perennial legumes.

It is important to note that when choosing grasses, other factors - such as soil type and rainfall - need to be considered. Not all species listed in Table 1 are suitable for planting as pasture grasses in every location or situation. Any species that is stressed and/or compromised due to its poor adaptation will be more susceptible to pasture mealybug.

Figure 4: Callide and Reclaimer Rhodes with legumes growing in Bisset bluegrass affected pasture. Photo Naomi Diplock, AHR

Table 1. Tolerance ranking of grass species to pasture mealybug

	Species	Common name	Cultivar(s)	Confidence rating*	Soil type adaptation	Annual rainfall requirement# (mm)
Tolerant	*Urochloa brizantha*	Brizantha	Mekong	M	Loam - clay	>800
	Urochloa humidicola	Humidicola	Tully	M	Loam - clay	>1000
	Lolium multiflorum	Italian ryegrass	Multiple (+ AR37 / AR1)	M	Loam - clay	>600$
	Lolium perenne	Perennial ryegrass	Multiple (+ AR37 / AR1)	M	Loam - clay	>800$
	Megathyrsus maximus	Guinea grass	Hamil	L	Sandy/loam - clay	>800
Moderately Tolerant	*Cenchrus ciliaris*	Buffel grass	Biloela	H	Sandy/loam - clay	>600
	Megathyrsus maximus	Panic	Gatton; G2; Megamax059	H	Sandy/loam - clay	>700
	Setaria sphacelata	Setaria	Multiple	L	Sand - clay	>900
	Astrebla lappacae	Curly Mitchell grass	Native	L	Clay	>250
Low tolerance	*Chloris gayana*	Rhodes grass	Multiple	H	Sand - clay	>750
	Megathyrsus maximus	Green panic	Petrie	H	Sandy/loam - clay	>700
	Dichanthium aristatum	Angleton grass / Floren bluegrass	Floren	M	Clay	>700
	Setaria incrassata	Purple pigeon	Inverell	M	Clay	>550
	Urochloa decumbens	Signal grass	Basilisk	L%	Loam - clay	>900
	Bothriochloa pertusa	Indian couch	Medway; Keppel	L	Sand - clay	>600
Moderately susceptible	*Panicum coloratum* var. *Makarikariense*	Bambatsi panic	Bambatsi	H	Loam - clay	>500
	Digitaria eriantha	Digit grass	Premier	M	Sand - clay	>500
	Digitaria milanjiana	Finger grass	Strickland	M	Sand - clay	>600
	Bothriochloa bladhii subsp. *bladhii*	Forest blue-grass	Native	L	Sandy/loam - clay	>650
	Bothriochloa bladhii subsp. *glabra*	Forest blue-grass	Swann	L	Sandy/loam - clay	>650
Highly susceptible	*Bothriochloa insculpta*	Creeping bluegrass	Bisset	H	Loam - clay	>700
	Cenchrus ciliaris	Buffel	American / USA; Gayndah	H	Sandy/loam - clay	>300
	Paspalum mandicorum	Broad-leaved paspalum	NA	H	Loam - clay	>900
	Cenchrus clandestinus	Kikuyu	Multiple	H	Loam - clay	>800
	Urochloa mosambicensis	Sabi grass	Nixon	H	Sandy/loam - clay	>600
	Digitaria eriantha	Pangola	NA	L	Sandy/loam - clay	>750
	Dichanthium sericeum	Qld Bluegrass	Native	L	Clay	>500
	Paspalum notatum	Bahia grass	Competidor; Riba	L	Sand - loam	>800
	Paspalum dilatatum	Paspalum / Dallis	Common	L	Sandy/loam - clay	>750

* **H**=high confidence, **M**=moderate confidence, **L**=low confidence, # = for long-term persistence in grazed pastures

$= Temperate species needing winter rainfall or irrigation, % = Low tolerance in Queensland, tolerant in northern NSW

Behind the scenes of trials and data sources: what you need to know

The tolerance ratings in the table above were developed considering different data sources including field trials, glasshouse studies, and observations from existing pastures. Due to varying observations and inclusion of specific species into research trials, as well as consistency of outcomes, a level of confidence in the tolerance of pasture mealybug has been developed for each species. The meaning of each confidence level is provided below.

1. **High confidence**: Existing pastures in multiple regions and districts have had consistent levels of tolerance or susceptibility to pasture mealybug. These observations are supported by field trials and glasshouse studies which have shown similar levels of tolerance or susceptibility.

2. **Moderate confidence**: Fewer observations in existing pastures, or limited field trials and/or glasshouse studies to support field observations.

3. **Low confidence**: Tolerance or susceptibility ratings based on a single type of data. i.e. field trials or glasshouse study results or existing pastures.

Most of the contributing evidence has been assembled from research trials and field surveys of producers' properties and experiences in central and south-east Queensland. In northern NSW, limited plot trial work has been completed, and the current recommendations are based on Queensland experience.

More information

Pasture Dieback Management Guide

Link to Pasture Dieback Industry Network- factsheets, videos

Pasture Dieback Identification booklet

Meat & Livestock Australia
Level 1, 40 Mount Street
North Sydney NSW 2060
Ph: 02 9463 9333
mla.com.au