



Dieback Dilemma - a statistical tale

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- Fenceline conundrum

Queensland Pasture Resilience Program

Background

- 1926 – 1927 Cooroy district (South-East Qld)
Paspalum pasture / recovered naturally
- 1993 – 2000 Dawson Valley (Central Qld)
Buffel grass (American & Gayndah only)
PhD (Sandrine Makiela; CQU)
=> inconclusive – maybe fungal?
- 2015 – re-appeared in CQ

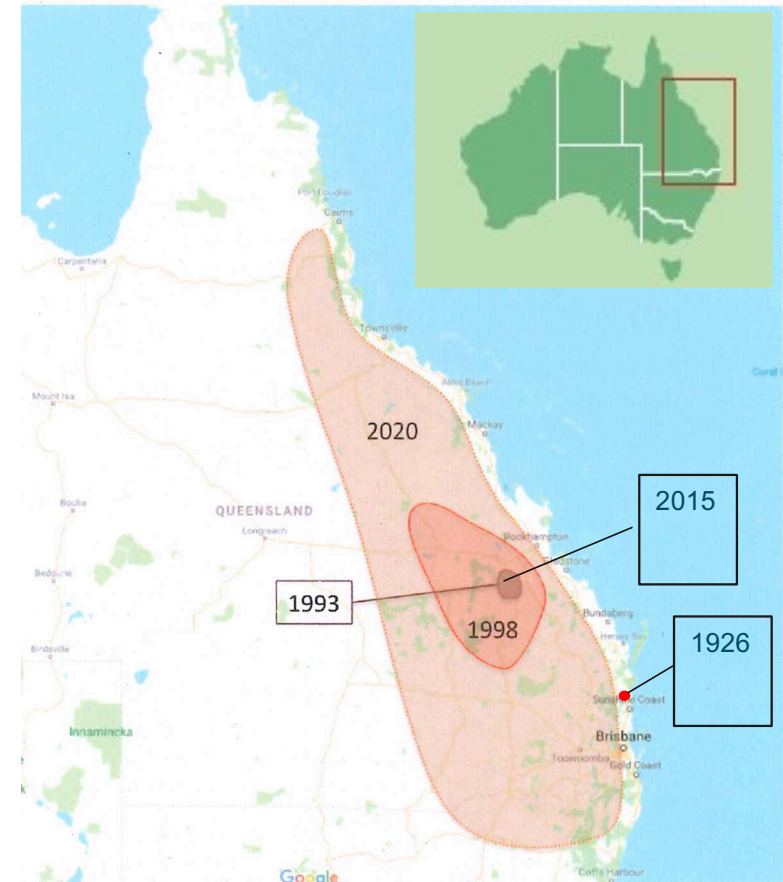
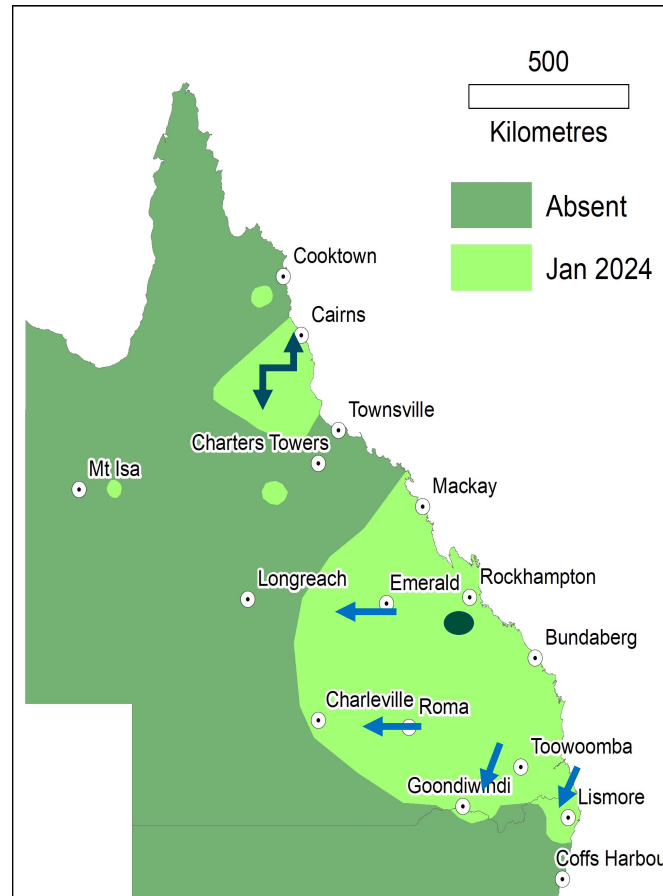


Figure 1. Area potentially affected by pasture dieback

... and it is spreading!



So ... what is Pasture Dieback?

- *“A broad term referring to areas of plants dying without an obvious cause.”* (2018 MLA guide)
- *“A condition that causes unthrifty growth and premature death of tropical and sub-tropical grasses.”* (Buck, QDAF)

⇒ Not a precise definition 🙄

Often described more by its symptoms and its distinguishing characteristics.





Symptoms – 4 stages



AASC24, Rottnest Island, WA, 2-5 September 2024





Impact of Pasture Dieback

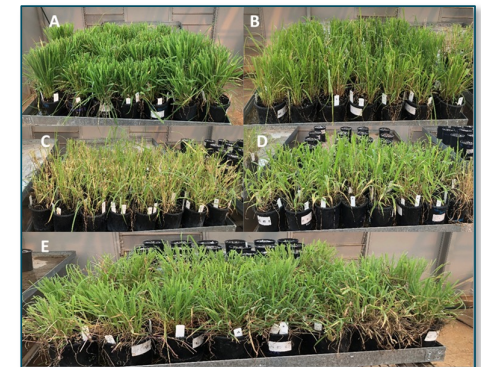
- Reduction in pasture growth
- Unpalatable plants
- Invasion of broadleaf weeds and legumes
- Reduced ground cover

*Currently worth ~ \$50M
annually in production losses
in Qld*



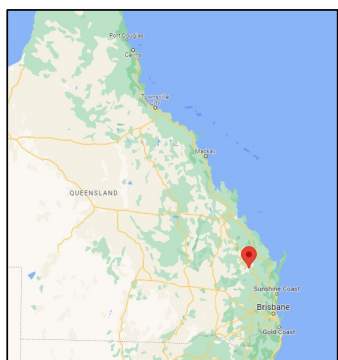
Research program

- Internal QDAF funded from 2016 – multi-disciplinary team
 - Characterisation – >100 sites across Qld
 - location, mapping (remote sensing), situation analysis (producer survey), nutrition, climate
 - Field trials – Management options / species evaluation
 - Research station and producer property trials
 - Diagnostics to determine cause(s) – sampled >150 sites
 - fungi, viruses, microbiome, nematodes, insects (mealybug)
- MLA funding from 2020 – 2 projects (causes/management)



Management options

- 2 management trials – Dead & Affected areas
 - same 13 treatments x 2 (dead) or 4 (affected) reps
 - cult ± resow, fert, fung, insect, slash, burn, control



- species evaluation
 - 22 treatments x 3 reps
 - 5 legumes, 14 grasses (11 + 3 +/- coated seed)



Above: May 2018,

Below: May 2019



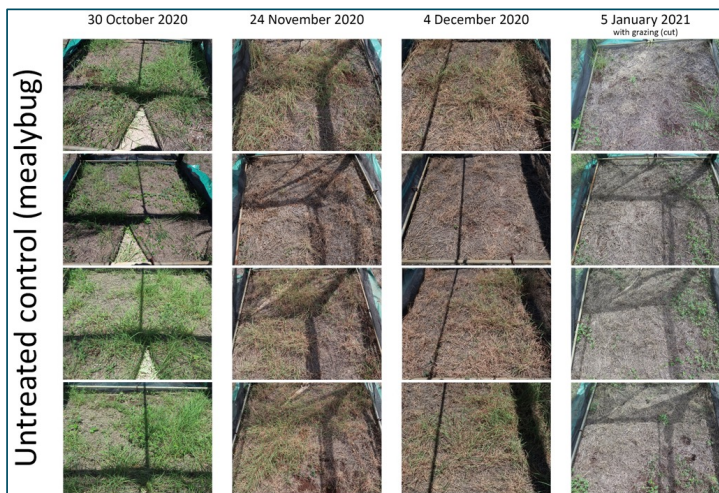
Affected



Dead



Diagnostic research: Pasture mealybug





(Intriguing) Statistical issues

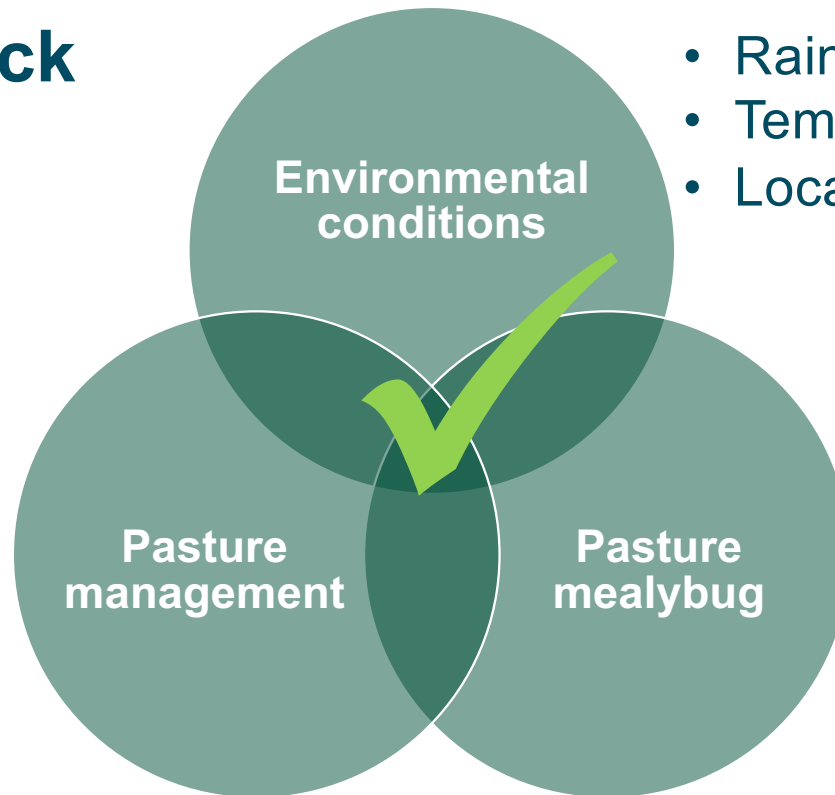


- Vague definition - designing when unsure what it is 😞
- Difficult to diagnose - many conditions with similar symptoms; must die to confirm dieback 🤔
- Can't create / generate dieback - limits design options / restricted to dieback in field
- May naturally regenerate – issue when plots (esp. controls) regenerate naturally (photos)
- Sampling strategies - dead pasture; unsure what to sample (part. in early stages)
- Relationship with climate - neighbouring paddocks with / without dieback

Research outcomes (1) – cause(s)


Pasture dieback requires:

- Biomass (mod-high)
- Susceptible species



- Rainfall (dry period)
- Temperature (high)
- Location (>600 mm)

+ secondary infections – fungi / viruses?



Research outcomes (2) – management

... so what can be done about pasture dieback?

PREVENTION?

No reliable / practical prevention strategies (currently) 😞

ERADICATION?

No cost-effective eradication strategies (currently) 😞

MANAGE IT?

Yes, the only solution at this stage! 😊

Conclusion – the fence line?

