How to identify pasture dieback

Fact sheet 2

What predisposes pastures to dieback?

Current observations indicate pasture dieback is commonly detected in high pasture yield situations along the eastern coast of Queensland and northern New South Wales. Pasture dieback can occur in a range of topographical situations (ridges, gullies, slopes, flats). Several climatic and management factors can influence the amount of pasture grown and hence the potential predisposition to dieback. These include (but are not limited to any combination, or all, of the following):

- higher than average annual rainfall over consecutive years
- long-term conservative stocking rates
- deferred grazing practices, for example spelling paddocks over the summer growing season
- excluding stock for long periods of time (un-grazed situations)
- application of fertiliser together with conservative stocking rates resulting in long-term high pasture yield

Once dieback has occurred in a pasture, symptoms may be seen in seedlings while pasture yields are still low. Dieback has also been commonly observed when a dry period (where the pasture is dormant) is followed by a wet period in which the pasture affected by dieback does not respond. In these cases, pastures that are affected generally have moderate to high biomass yields before the dry period.

Characteristics of pasture dieback

Pasture dieback causes unthrifty growth and premature death of tropical and sub-tropical grasses. Pastures in eastern Queensland are affected, specifically north and central Queensland, Wide Bay-Burnett and south-east Queensland. Dieback in tropical grass-pastures was confirmed in north-east New South Wales early 2020.

Pastures are initially affected in patches and exhibit leaf yellowing, reddening, or both, poor growth and senescence, and premature death. For reliable diagnosis other potential causes of the observed symptoms need to be ruled out and pastures need to progress through the full cycle of symptoms through to death. Currently, no confirmed causal agent(s) have been identified.

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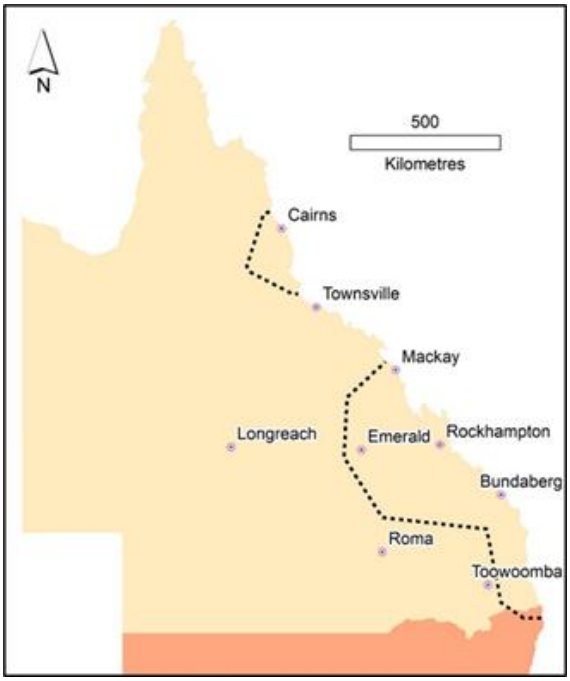

Map: General areas (East of the dotted lines) where pasture dieback has been observed and reported across Queensland and north-east New South Wales.

See *Fact sheet 3: Research into management solutions for pasture dieback* for more information

Photos below, top to bottom:
1. Pasture dieback in creeping bluegrass pasture on side of hill, note presence of broadleaf weeds.
2. Grazed buffel grass unaffected by pasture dieback left of fence; non-grazed buffel grass affected by pasture dieback right of fence.

How do I know if I have pasture dieback?

Pasture dieback causes premature death of otherwise healthy grasses typically in patches across paddocks. The condition is more evident during the growing season (spring – autumn), especially after high rainfall. In the growing season, dieback-affected plants are easily contrasted against green healthy plants. Once affected, pastures can die within one season. Accurate identification of pasture dieback can be problematic due to similarities with other conditions. Three factors need to occur before pasture dieback can be definitively diagnosed.

1. Pastures need to be in the right location and exposed to conducive conditions. Dieback affects tropical and sub-tropical grass species, typically in high biomass yielding situations in higher rainfall districts (eg eastern Queensland). High pasture yield could also be due to high soil fertility (or from fertiliser), the long-term use of conservative stocking rates (i.e. low to moderate utilisation), or a combination of both.

2. Pastures need to progress through the full cycle of symptoms. These are: initial-stage, mid-stage, late-stage and end-stage. A definitive diagnosis is unlikely if plants haven't exhibited the full range of symptoms through to plant death. Therefore, multiple assessments over time are generally needed. These stages are common across all grass species observed to be affected by dieback.

3. Confidence that nothing else could be causing the observed symptoms. Leaf symptoms of yellowing and/or reddening of leaves, unthrifty plant growth and premature death can all be described as stress responses. Many other environmental and management factors can generate similar outcomes and need to be ruled out. These include (but are not limited to).
    - moisture stress (either drought or waterlogging)
    - nutrient deficiency, or tie-up (such as pasture rundown)
    - temperature stress (frost, heat waves)
    - high pasture utilisation
    - soil variation, including chemical imbalances (pH, salinity, sodicity)
    - time of year (late in the season)
    - herbicide damage
    - or a combination of these.

Initial stage

Mid-stage

Late-stage

End-stage

Symptom cycle

Initial stage

Yellowing and/or reddening of individual leaves, starting from the oldest leaves first on small numbers of pasture plants, or in patches of plants across the paddock. Variation in leaf colouration can occur between some grass types during the initial and mid stages. For example, Rhodes grass and green panic do not commonly exhibit reddening; yellowing of leaves is more typical. Whereas paspalum and seteria typically exhibit leaf reddening only at this stage.

Mid-stage

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.

Late-stage

Patches of near-dead or dead pasture, or whole paddocks in severe cases.

End-stage

Patches, or whole paddocks, of dead pasture with loosely attached grey coloured stems or crowns. Broadleaf plants can be found growing in these patches if subsequent rainfall has occurred.

How is pasture dieback different from pasture rundown?

Pasture rundown is the reduction of pasture growth over time due to the tie-up of soil nutrients (primarily nitrogen) in sown pastures. Pasture quantity and quality gradually reduces over time, however plants remain alive, and large areas can be uniformly affected, for example, whole paddocks, properties and districts. Conversely, pasture dieback is expressed as unthrifty or dead patches throughout relatively well grown pasture. In more severe cases whole paddocks can be affected. These patches can occur very quickly – for example, during one summer season. Plants in these patches die, and dead areas can be subsequently colonised by broadleaf plants (weeds or legumes).

For more information on pasture rundown, search for 'rundown' on the FutureBeef website.

Photos top to bottom:
1. Buffel grass pasture affected by dieback. Note the dead patch (left of photo) surrounded by well-grown buffel grass without any other grass species.
2. Buffel grass pasture affected by rundown. Note the low biomass of the buffel grass and the prevalence of other grass species, especially Indian couch, in the back of the photo.

Where to get more information

- FutureBeef: www.futurebeef.com.au
  - Fact sheet 1: What is pasture dieback?
  - Fact sheet 3: Research into management solutions for pasture dieback
  - Fact sheet 4: How to manage pasture dieback
  - Pasture dieback: past activities and current situation across Queensland report
- Meat & Livestock Australia: www.mla.com.au
- New South Wales Department of Primary Industries: www.dpi.nsw.gov.au

Compiled by Stuart Buck, DAF Rockhampton, March 2021

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Who can producers contact about pasture dieback?

The DAF team is encouraging graziers affected by dieback (existing, new, or recovered) to make contact. This will help us understand this condition better, and to provide any available assistance. Please call the DAF Customer Service Centre on 13 25 23.

You can also contact:
Stuart Buck, Pasture Agronomist and DAF Pasture Dieback Project leader
(07) 4843 2605 or stuart.buck@daf.qld.gov.au

Nicholas Brazier, Pasture Agronomist
(07) 4843 2631 or nicholas.brazier@daf.qld.gov.au

Or visit your local DAF office and talk to a DAF extension officer.