

# Project update

## P1b Investigating Kikuyu toxicity

Kikuyu is a perennial pasture species commonly grown in NSW for livestock production.

It is classified as a C4 grass which means it is adapted to warm or hot conditions. Kikuyu is fast growing and produces more dry matter – of higher quality – than other C4 grass varieties.

However, there's still a lot to learn about Kikuyu, including uncovering the cause of Kikuyu poisoning – a risk for livestock producers.

### Kikuyu poisoning

Cattle deaths and illness officially linked to Kikuyu poisoning are rare.

The last major event was in the NSW Hunter Valley in the early autumn of 2018-19.

This case was diagnosed because it included several farms reporting dead or dying animals within a few days of them grazing Kikuyu.

Kikuyu poisoning – or toxicity – is frequently associated with environmental conditions, specifically solely grazing, fast-growing Kikuyu in the autumn, immediately after a summer drought or prolonged dry conditions.

### Cause

The compound or mechanism making Kikuyu toxic to cattle under these conditions is unknown.

Kikuyu toxicity is difficult to research because of the unpredictability and rarity of Kikuyu poisoning. The only definitive way to tell if cattle have Kikuyu poisoning is a combination of the history, clinical signs, and specially looking for damage to the forestomach (necropsy findings).

Specific signs linked to Kikuyu toxicity include dehydration, sham drinking (trying to drink but unable), abdominal pain, unsteady gait, drooling and death. But not all cattle suffering from Kikuyu poisoning present with these signs. In some instances, the animals can recover,

### Unlocking the potential of Kikuyu

Dairy UP's P1 project aims to unlock the potential of Kikuyu pastures used by NSW dairy farmers. P1 is a suite of five projects that collectively explore new management options to grow and utilise more Kikuyu over summer and increase the productivity of Kikuyu-based pastures.

P1a: Remote pasture management using advanced sensing technologies

P1b: Antinutritional Factors (toxicity)

P1c: Genetic diversity of Kikuyu

P1d: Carbon on NSW dairy farms

P1e: Real time prediction and manipulation of Kikuyu's nutritive value for animals.

This document provides an update on P1b: Antinutritional Factors (toxicity).

although they will not be as productive as before, given the damage to the digestive system.

Some affected cattle are reported as Kikuyu toxicity cases; however, many remain unreported, with their illness blamed on other causes or not investigated.

### Project aim

DairyUP researchers want to find out why Kikuyu can become toxic, so dairy farmers can use the grass with confidence.

Ideally, project outcomes would include the development of new Kikuyu varieties that are less susceptible to toxicity events, diagnostic tests to evaluate pasture safety, in-field preventative treatments and treatments for affected cattle.

Alternatively, providing any sort of clarity around Kikuyu toxicity would also aid dairy farmers and their understanding of the issue as well as inform

future grazing management practices and research.

## Benefits

At the back of every livestock producer's mind – whose cattle grazes Kikuyu – is the looming threat of Kikuyu poisoning. Although Kikuyu poisoning is infrequent, it remains a risk and can prevent dairy farmers from unlocking all the benefits of Kikuyu.

Understanding the underlying reason for Kikuyu poisoning would enable dairy farmers to manage their herds and pastures with increased confidence. There would also be more assurance using Kikuyu as a feed option – potentially providing more homegrown feed alternatives year-round.

Kikuyu poisoning also affects beef cattle. Sheep and goats are also affected but are less susceptible. Therefore, any findings could benefit Australia's entire livestock sector.

## Research approach

Collecting and analysing grass and soil samples across NSW has been a priority and is ongoing.

These samples are providing provide a normal "baseline" for reference and comparison with "toxic" Kikuyu.

These samples are being examined using a technology called metabolomics. Metabolomics gives a "fingerprint" of the many compounds included in a grass sample. Researchers will use this database of compounds to potentially identify toxic compounds.

In addition, the environmental conditions that are understood to precede Kikuyu toxicity have been created inside a greenhouse. This trial includes the most common commercial Kikuyu cultivar, Whittet, and developmental strains.

Researchers are examining how the different varieties and their associated microorganisms, including fungi, respond to the greenhouse conditions to identify what role genetics plays in Kikuyu toxicity or if potentially toxic microorganisms flourish under these conditions.

## On-farm monitoring

DairyUp researchers from the NSW Department of Primary Industries Elizabeth Macarthur Agricultural Institute and the University of Sydney visited the farms affected by Kikuyu poisoning in 2018-19, collecting soil and grass samples.

Researchers have also taken samples from other farms from across NSW and spoken to farmers about their observations of Kikuyu poisoning.

## Progress update (March 2024)

Sample analysis and the greenhouse trial are ongoing.

## Next steps

Sample analysis will continue as researchers build a database of Kikuyu metabolic compounds.

At the end of the greenhouse trial, microorganisms that flourished under the 'drought and rewater' cycle preceding Kikuyu toxicity will be examined.

Researchers will investigate if these microorganisms were linked to Kikuyu toxicity in the past and how this could affect cattle health.

The genetics of the Kikuyu varieties will also be studied to understand how they may or may not have better resilience to toxicity.

## How farmers can help

The good thing about Kikuyu poisoning is that it's rare, but this means it can be difficult to source grass and soil samples from toxic pastures.

Researchers need as many "toxic" samples as possible for analysis.

Any farmer with suspected Kikuyu toxicity is encouraged to contact DairyUP researchers.

## Collaborators

The P1b project is a collaboration between Dairy UP, University of Sydney and the NSW DPI.

## More info

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