

Project update

P1c Exploring genetic variability of Kikuyu

Kikuyu cultivars

Kikuyu grass is a C4 grass adapted to both the tropics and temperate climates. It is fast growing and produces more dry matter of higher quality than most C4 grasses. However, the last kikuyu pasture cultivar that was released for grazing (Whittet) was developed more than 40-years ago.

Kikuyu genetic research

The University of Sydney in collaboration with Hatton's Turf Research has been breeding improved kikuyu grasses for more than 15-years. These new materials have greater biomass production, tolerance to salinity and drought and represent significant new diversity for nutritional factors.

Industry needs

Current kikuyu pasture cultivars are limited in adaptation, nutritional quality and scope. However, the extent of adaptation in the new materials developed by the University of Sydney and Hatton's remains largely untested in most dairy producing areas. The nutritional status of these materials when grown in a broader range of environments is also untested. Such information could lead to the release of improved pastures and will provide a basis for continued breeding and selection.

Project aims

This project is exploring and evaluating promising lines of Kikuyu that have been selected for increased biomass production and tolerance to salinity and drought.

Benefits

Given that Australia's pasture lands are increasingly subject to moisture stress and warmer temperatures, this climate-ready pasture could provide greater flexibility to the animal industries including dairy.

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: Environmental Impact of Kikuyu-based systems

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

This document provides an update on P1c: Genetic diversity of Kikuyu.

Research approach

Year 1

Thirteen distinct kikuyu genotypes property of Hatton Turf Research Pty Ltd (Theresa Park, NSW), plus two commercially available varieties (controls) were evaluated in the first year in small replicated plots at the Plant Breeding Institute in Cobbitty.

The plots were exposed to natural conditions. Soil nutrient/moisture and daily weather were assessed throughout the experimental period (using tiny tags at remote locations). Plots were cut for biomass assessment at key periods of the year and rate and extent of re-growth assessed. Materials have been screened for nutritive value and local adaptation. Concurrent pot studies were conducted in a hydroponic system at PBI for more detailed assessment of nutritive traits.

The same traits were assessed in the field at both locations for comparison and determination of stability.

Progress update (August 2023)

Three new Kikuyu lines have been identified for further screening. This will involve plot larger trials at more locations in 2024.

These lines appear to be resistant to disease and grow quickly with high yields over 12 months (in excess of 20 tonnes/ha/yr). Their nutritional values are high in terms of crude protein, water soluble carbohydrates and fibre.

A DNA survey of Kikuyu fields continues, and we expect to have an accurate estimate of on farm genetic diversity within the next few months.

Several lines are concurrently being testing in P1b for differential toxicity response and a PhD student, Vivien Tan, is working across both P1b and P1c to document outcomes.

Next steps

The project plan is for the three new lines plus Whittet will be sown at different locations on the NSW north and south coast to confirm observations from the initial trials including nutritive value. The same suite of traits will be assessed at each location. At the same time, these lines will be screened under inoculation for resistance to common diseases of kikuyu.

Based on these results, replicated strip trials of at least two genotypes will be established on several locations in NSW with grazing permitted in year three and four.

Superior lines suitable for commercialisation will be identified for multiplication and dissemination by year four.

Collaborators

The P1c project is a collaboration between researchers from Dairy UP, University of Sydney and Hattons Turf.

More info

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