



Unlocking Deeper Soil Moisture

Comparing Water Use in Multispecies and Conventional Pastures



Can multispecies pastures go longer between irrigations while maintaining productivity?

Multispecies pastures that include deep-rooted species such as plantain and chicory may be able to access stored soil moisture from deeper in the soil profile than conventional ryegrass-clover pastures. If this is the case, it raises the question, can multispecies pastures maintain growth for longer between irrigations, reducing irrigation requirements and improving the utilisation of rainfall?

Hosts: Peter and Kate Mirams

Trial location: Newry, Gippsland VIC

Farming System: Pasture-based dairy farm

Background

This demonstration will investigate how pasture species composition and irrigation management influence water use, soil moisture dynamics, runoff and pasture productivity under surface irrigation conditions in Gippsland. The project is being undertaken at the established *Soils for Life* Newry Regen Trial site and will compare multispecies and conventional pasture systems under both standard and extended irrigation intervals.

Key focus areas

This project will investigate whether multispecies pastures can:

- Utilise stored soil moisture more effectively
- Support longer irrigation intervals
- Maintain pasture production under reduced irrigation frequency
- Improve water-use efficiency
- Reduce runoff and nutrient losses from irrigated paddocks
- Increase infiltration and rainfall capture.



Kate and Peter in their multispecies pasture bay

Method

The demonstration consists of paired surface irrigation bays:

- Conventional rye grass-clover pasture and
- Multispecies pasture containing deep-rooted species.

A standard irrigation treatment will irrigate both pastures according to the requirements of the conventional pasture, enabling direct comparison under the same schedule. An extended irrigation treatment on a second pair of bays will test whether multispecies pastures can tolerate longer periods between irrigations by relying more heavily on stored soil water.

The second treatment will deliberately allow greater soil moisture deficits to develop before irrigation occurs.

The results will be captured using the following:

Soil Moisture

Soil moisture probes have been installed to 1.9m depth to continuously monitor soil water extraction, water storage within the soil profile, recharge after irrigation and rainfall events, and potential movement of water below the root zone.



1.9m soil moisture probes pre-installation at the demonstration site

Water applications

The volume of irrigation water applied to each bay will be measured using Southern Rural Water flow rate delivery records supplied to the farm outlet and bay irrigation times recorded through the WiSA automation system.

Runoff

Runoff from each bay will be measured using V-flumes installed at the bay outlets with automated water level loggers.



Calibrating and testing the V-flumes

Infiltration

High frequency soil moisture measurements will be used to assess how quickly water moves through the soil profile following irrigation events. This will provide insight into differences in infiltration performance between the conventional and multispecies bays.

Pasture Production

Pasture production will be measured through regular pre-post grazing dry matter assessments.

Water quality

Samples of runoff water at the flumes will be collected following standard irrigation, irrigation following fertiliser application and significant rainfall events to compare off paddock nutrient exports between the two bay types.

Water-Use efficiency

Dry matter production per megalitre of irrigation applied, irrigation water applied per hectare and soil water extracted between irrigation events will assess water-use efficiency.

Potential benefits for irrigators

The project will provide practical information to help irrigators:

- Better understand the water requirements of multispecies pastures
- Determine whether irrigation intervals might be extended safely without compromising pasture performance
- Improve irrigation scheduling decisions
- Improve water use efficiency
- Reduce runoff and nutrient losses
- Make informed decisions about pasture system selection and management.

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This farmer-led demonstration is part of the Learn.Irrigate.Grow program, delivered in partnership by Agriculture Victoria and WGCMA.

The program uses on-farm trials to help local farmers explore new ways to irrigate smarter, improve productivity and protect our waterways.

The Program is funded through the Victorian Governments Sustainable Irrigation Program.

We acknowledge and pay our respects to the Traditional Owners of the region, the Gunaikurnai, the Bunurong, the Boonwurrung and the Wurundjeri Peoples and pay respects to Elders, past, present and emerging.