UNIVERSITY of TASMANIA

TIA

Tasmanian Institute of Agriculture

Tasmanian Government

TIA is a joint venture of the University of Tasmania and the Tasmanian Government

Australian Government
Department of Agriculture, Water and the Environment

Future Drought Fund

Drought resilient pastures

Project: Farming Forecaster

utas.edu.au/tia

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Background

The aim of this work was to explore drought resilient pasture species in Tasmania, Australia.

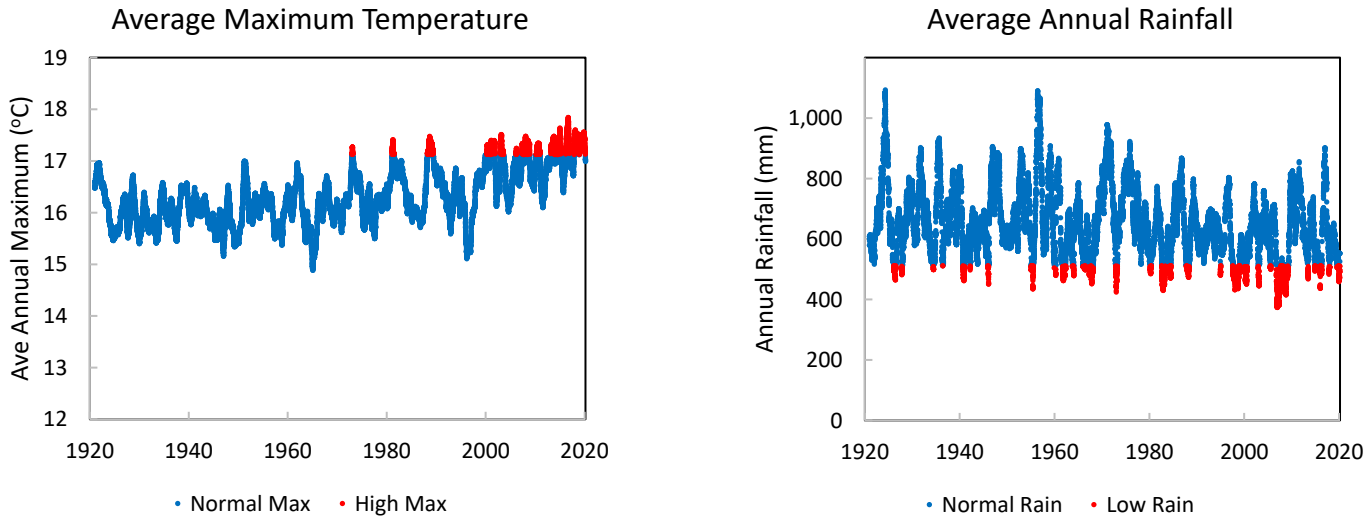
Tall fescue and cocksfoot were identified as the top two pasture species with ability to survive drought and recover rapidly after drought. Phalaris is also hardier than these in some areas and should also be considered. This was identified through discussions with farmers.

Drought resilient pastures: *Cocksfoot (left) and tall fescue (right).*

Long term climate change and extreme weather events

The Tasmanian climate is changing, with maximum daily temperatures increasing since 1960. Data shown here are from 20 typical properties in the sheep-production areas of Tasmania, primarily the Midlands. Annual rainfall has been variable but has decreased slightly. There has been a small increase in years with rainfall in the lowest 10% and an increase in the number of consecutive years of drought. Extreme heat in summer has become more frequent.

Because temperatures have been rising, evaporation rates have increased. This means that for the same amount of rainfall, more is lost to the atmosphere, and less is available to the plant. Even in the absence of changes in rainfall, climate change is reducing plant available water.



A changing climate: *Average annual maximum daily temperature and rainfall from 1920 to 2022. The highest 10% of temperatures and lowest 10% of rainfall periods are shown in red.*

Australian Government

Future Drought Fund

NRM SOUTH

NRM North

This event is supported by NRM South and NRM North through funding from the Australian Government's Future Drought Fund and the Tasmanian Government's core support for Natural Resource Management.

Pastures for drought resilience

Farmers in Tasmania suggested that cocksfoot and tall fescue may have greater drought resilience than other pasture species, although phalaris was also put forward as a drought resilient pasture.

The farmers we engaged suggested that cocksfoot and tall fescue may have high production when water is available, but reduced biomass production during dry periods, conserving water and allowing them to survive prolonged drought.

Cocksfoot and tall fescue also have deeper roots than many other species, using water more efficiently when surface water is low.

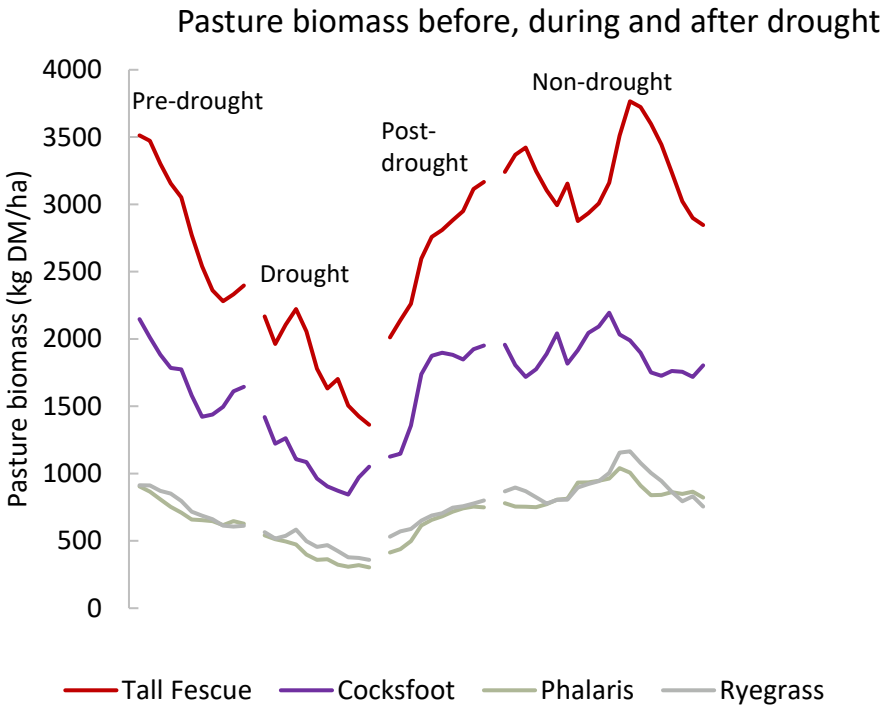
Drought resilience requires pasture species to survive during and recover rapidly after the drought has ended.

Cocksfoot and tall fescue were modelled dynamically over 100 years at 20 sites in Tasmania in mixtures with other common pasture species in Tasmania.

Simulations revealed that these species had high ground cover (>90%) most of the time, with phalaris also providing good ground cover in some areas.

We used the following definitions:

- **Drought** as periods of at least 12 months of rainfall in the lowest 10% of annual rainfall.
- **Pre-drought** as the 12 months preceding a drought.
- **Post-drought** as the 12-month period following a drought.
- **Non drought** as all other periods.



Production pre-, during and post- drought of tall fescue, cocksfoot, phalaris and ryegrass in Tasmania, Australia.

Pasture production

During drought, cocksfoot and tall fescue maintained a relatively high level of production (kg dry matter/ha). In the 12 months after drought, these species tended to recover to a level similar as, or greater than, non-drought periods.

Phalaris and perennial ryegrass (also being common pasture species in Tasmania) had low production during drought and did not recover as well in the 12 months following drought compared with cocksfoot and tall fescue, but phalaris should be considered for some areas.

The productivity of phalaris and perennial ryegrass was greater during periods not under drought (data not shown here).

In mixed pasture swards, cocksfoot and tall fescue increase their prevalence in the periods following drought due to their more rapid recovery than other species.

SUMMARY

Following drought, pasture biomass is typically low, while livestock need high quality feed for maintenance, growth and/or milk production.

Pasture ecotypes with good energetic value that survive during and recover quickly following drought are needed for resilient and profitable farming systems following drought.

For more information please visit the Farming Forecaster website: www.farmingforecaster.com.au
Or Species for Profit – edition 2 2021 **(nre.tas.gov.au)**

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