

Evaluation of pasture species for saline/waterlogged soils

Property of Ian and Theresa Peirce, Duranillin

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Background

Increasing the productivity from saline soils is an integral part of a strategy to manage dryland salinity in Western Australia. A key element is the development of pasture plants (annual and perennial legumes and grasses) with tolerance of low to moderate levels of salinity. A range of species and genotypes has been identified with putative tolerance of salinity/waterlogging. This material requires testing in the field to enable identification of promising material for further selection and evaluation. The same set of material has been sown at Tammin and Dumbleyung and will also be concurrently evaluated in New South Wales, Victoria and South Australia.

This work links in with both the National Annual Pasture Legume Improvement Program (NAPLIP) and the Plants for Discharge program in the Salinity CRC. It is also a component of the Land and Water Australia Sustainable Grazing from Saline Lands (SGSL) project.

Aim

To identify adapted pasture legumes and grasses with tolerance of moderate levels of salinity and waterlogging for use in the farming systems of Western Australia.

Site information

Mean annual rainfall	525 mm
Soil type	Sandy loam
Conductivity	220 mS/m
pH (CaCl ₂)	5.6
Phosphorus	8 mg/kg
Potassium	65 mg/kg
Iron	52 mg/kg
Copper	0.07 mg/kg
Zinc	0.29 mg/kg
Manganese	1.9 mg/kg

Experimental Design

The trial is split into 3 sub-trials to enable management of similar plant types:

- a). Annual legumes (32 entries)
- b). Perennial legumes (12 entries)
- c). Perennial grasses (8 entries)

Each sub-trial consists of a randomised block design, with 3 replicates and 2 blocks per rep.

Plots: 5m x 1m, with 1.5m bare ground buffers between plots and 2m buffers between blocks.

Sowing date: June 14, 2002.

Sowing rates: legumes @ 16 kg/ha, grasses @4 kg/ha, drilled in with a 50:50 mix of Super-MoCuZn and Super-Potash (3:1) @ 200 kg/ha.

Surrounding area sown to a mixture of Frontier balansa clover @10 kg/ha and lucerne @ 10 kg/ha.

Planned Measurements and Observations

- Plant establishment: seedling counts 6 weeks after sowing
- Herbage production and pasture composition each winter and spring
- Groundcover: (proportion of soil surface covered by plant material): annual assessments at the end of spring
- Persistence: plant counts 4-6 weeks after the break of season
- Tolerance to any pests and diseases
- Seed production (annual species only): determined each summer
- Soil conductivity mapping to measure variability across the site
- Symptoms of salinity stress

The trial will run for 3 seasons.