

Perennial grain crop for salinity control

Annual crops often struggle to use available soil moisture each season, with some water leaking beyond the root zone and contributing to dryland salinity. This article outlines the CSIRO development of a perennial grain crop to help curb rising watertables in cropping areas.

by **Ted Lefroy**,
CSIRO

Arable land prone to erosion and rising watertables could be made more sustainable with the development of a new perennial crop.

The new crop, being developed by CSIRO and the University of Western Australia (UWA), will be dual-purpose — providing fodder for grazing animals and, in favourable seasons, harvestable grain.

The perennial crop will be suited to the 3–5 million hectares of marginal land across the high-rainfall areas that currently yield poorly under annual grain crops.

Being perennial, the crop will use more water than its annual counterparts, helping to curb rising watertables and provide year-round ground cover for erosion control.

Perennials use more water

Perennial plants are not usually considered as cropping plants because they invest more resources into living longer rather than reproducing and as a consequence produce low seed yields.

In contrast, annual plants are designed to produce an abundance of seeds before they die, making them obvious choices for crop development.

But annual crops often struggle to use the available water throughout the season and in some areas have contributed to rising watertables and dryland salinity.

To help combat some of these problems, the CSIRO–UWA research team set out to find a native perennial grass that could be used as a crop on sloping soils in the mid- to high-rainfall areas to soak up soil moisture and provide valuable feed and grain for grazing stock.

Native grass shows potential

Researchers examined a range of native perennial grasses for cropping potential by ranking them for seed size, seed yield, plant architecture and evidence of their use as food by Aboriginal people.

The research team settled on the native grass, *Microleana stipoides* or 'weeping grass', which is distributed widely throughout southern Australia.

While most perennial grasses produce seeds too small to be mechanically harvested, weeping grass stood out for its large seed size which is almost the size of commercial rice



Development of Australia's first perennial grain crop could help alleviate rising watertables and dryland salinity in the mid- to high-rainfall cropping areas. The crop will be dual-purpose, providing fodder for grazing animals and grain in favourable seasons. The seed size of the grain crop is similar to rice (inset).

varieties. Weeping grass also tolerates acid soils, drought and frost, and has high forage digestibility (55–80 per cent). Seed protein content is up to twice that of wheat (10–22%).

Other benefits include its indeterminate flowering habit that enables the grass to continue to produce seed and green feed throughout summer, provided soil water is available.

The grass does not require annual cultivation and because it is perennial, can make better use of available soil moisture — responding within weeks to out-of-season rainfall to provide valuable green feed.

Unlike annuals, the root system of the perennial weeping grass remains in the soil

permanently, helping to bind vulnerable soils and reduce erosion.

Variety development

Researchers have spent the past few years collecting weeping grass seed from southern Queensland, northern New South Wales and the south-west corner of Western Australia.

From this collection, the research team has grown and selected plants that show commercial promise such as plants that hold onto their seeds rather than shed them at maturity and plants that grow upright for ease of harvest.

Plants with favourable traits will form part of a plant breeding programme to develop a variety that will be suitable for wide scale planting in 5–10 years.

Early varieties will be suitable for stock feed, as year-round pasture and harvested grain. Future varieties could be suitable for human consumption.

Early results of wild plants

Seed yields ranged from 10–200 kilograms per hectare and although low, are expected to increase with selection and improved agronomy.

Yields of up to one tonne/ha eventually could be possible and have been achieved in American perennial grain crops.

Researchers hope the low cost to establish and maintain the perennial grain crop will offset its relatively low seed yield, making it both profitable and sustainable.

For more information contact Ted Lefroy at ted.lefroy@csiro.au, phone (08) 9333 6442 or fax (08) 9333 6444.



At a glance

- Perennial grain crops use more water than annual crops, helping curb rising watertables and dryland salinity.
- Australia's first perennial grain crop could be available in 5–10 years for use in the mid- to high-rainfall areas.
- Grain yields will be lower than annuals but cost of establishment will be less.
- The crop will be dual-purpose — providing fodder for grazing stock and harvestable grain in favourable seasons.

This article appeared in the February 2004 edition of the Kondinin Group's monthly magazine *Farming Ahead*. The Kondinin Group holds the copyright on the article but CSIRO has the unlimited right to reproduce the text royalty free in its own publications. Reproduction of this text in whole or part by any other publication or for any other purpose is not permitted without permission of the *Farming Ahead* editor. For more information contact the Kondinin Group on (08) 9478 3343.