

# Mackellar – virus beating wheat

## CSIRO Plant Industry



CSIRO Plant Industry plant breeders, supported by the Grains Research and Development Corporation (GRDC), have used a wild grass to produce Australia's first barley yellow dwarf virus resistant wheat variety.

Barley yellow dwarf virus (BYDV) is the most damaging cereal virus in the world and can cause yield losses in Australian barley, oats and wheats as high as 40-50 per cent.

Over the past fifteen years, CSIRO plant breeders have worked with Chinese researchers to screen wild grasses and have produced what may be the world's first BYDV resistant wheat variety.

Mackellar is the first of the new resistant varieties to be available and has been commercialised by AWB Seeds under an exclusive licensing agreement.

Data on Mackellar from three years and 31 trials in southeastern Australia have shown the average advantage of Mackellar over other similar wheats is 18 per cent, even under drought conditions, often yielding over eight tonnes per hectare. The advantage increases with earlier sowing and after grazing and is largely attributed to its BYDV resistance.

This translated into extra income of over \$700 per hectare, in comparison with a standard spring wheat variety.

While Mackellar is a feed wheat, a new CSIRO joint venture company, HRZ Wheats Pty Ltd, is working to incorporate BYDV resistance into new milling quality varieties, targeted for Australia's high rainfall zones.

The company is researching, breeding and commercialising milling quality wheat varieties and is a partnership between AUSGRAINZ, comprising CSIRO and New Zealand Crop and Food Research, and the Grains Research Development Corporation.

Named after the poet Dorothea Mackellar, this new variety was launched by AWB Seeds in 2003.



*Mackellar (right) may be the world's first BYDV resistant wheat variety*

### Mackellar facts

- Dual purpose winter wheat for grazing as well as grain production
- Very good level of resistance to stem, leaf and stripe rust
- Red feed quality grain
- Awnless (lacking bristles) to allow cutting for hay or late season grazing
- Excellent forage production
- The only BYDV resistant wheat cultivar in Australia.

### Rainfall

Mackellar is best adapted to the high rainfall zones of Australia. This area includes the slopes of NSW, irrigated areas, the drier parts of the long growing season area in VIC, Tasmania and SA, and the cooler regions of southwest WA.

### Soil type

Mackellar generally performs well on a range of soil types, however deep, well-drained soils are considered ideal.

Winter wheats are able to tolerate waterlogging for short periods, although with reduced production rates. Mackellar is moderately intolerant of acid soils.

### **Maturity**

Mackellar is a long season variety which has a vernalisation (exposure to cold) requirement before it will flower and produce grain. When the vernalisation requirement has been met, flowering in Mackellar will occur at a similar time as Brennan.

Mackellar can be sown from late February to June. If sown early, Mackellar must be grazed otherwise grain yield could be reduced. Mackellar has been selected to recover after grazing and produce high grain yields.

Mackellar can also be grown as a grain only crop if sown from late April to late June.

### **Plant characteristics**

Mackellar is a red grained, feed wheat. It is awnless which makes it suitable for late grazing and cutting for hay. It has a medium harvest height, is moderately resistant to lodging and has been selected to recover after grazing to produce high yields.

Similar to the other red-grained winter wheats Tennant and Rudd, Mackellar is tolerant to pre-harvest sprouting. CSIRO test results have shown Mackellar to have an average coleoptile length.

### **Grain characteristics**

Mackellar produces grain that is red in colour and is classed as Australian Winter Wheat (AWW).

Where separate winter wheat segregations are not available, winter wheat will be received as feed and binned with downgraded milling wheat varieties. Mackellar lacks certain baking qualities, which disqualify it as a milling wheat variety.

### **Disease and pest resistance**

Mackellar has a very good level of resistance to stem, leaf and stripe rust.

### **Plant Breeder's Rights**

Mackellar is protected by Plant Breeder's Rights. Any unauthorised commercial propagation or any sale, conditioning, export, import or stocking of propagating material of this variety is an infringement under the Plant Breeder's Rights Act 1994. Growers are allowed to retain seed from production of this variety for their own use as seed only. A breeder royalty will apply to this variety, at a rate to be confirmed.

### **Acknowledgements**

Mackellar was bred by CSIRO with support from AWB Limited and growers through the GRDC. Yield testing and disease resistance assessment was carried out by CSIRO with support from various state departments and grower organisations.

For more information on Mackellar, see the AWB Seeds website: [www.awb.com.au](http://www.awb.com.au)

### **Contact Us**

Phone: 1300 363 400  
+61 3 9545 2176

Email: [enquiries@csiro.au](mailto:enquiries@csiro.au)

Web: [www.csiro.au](http://www.csiro.au)

#### **DISCLAIMER**

CSIRO gives no warranty and makes no representation that the information contained in this document is suitable for any purpose or is free from error. CSIRO and its officers, employees and agents accept no responsibility for any person acting or relying upon the information contained in this document, and disclaim all liability for any loss, damage, cost or expense incurred by reason of any person using or relying on the information contained in this document or by reason of any error, omission, defect, or mis-statement contained therein.



### **Your CSIRO**

Australia is founding its future on science and innovation. Its national science agency, CSIRO, is a powerhouse of ideas, technologies and skills for building prosperity, growth, health and sustainability. It serves governments, industries, business and communities across the nation.