

**Strategies for Growing Canola in
Low Rainfall Environments of Australia**

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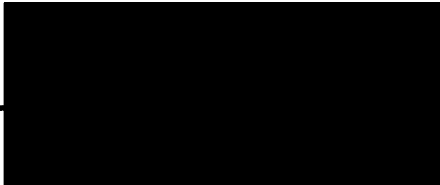
**A thesis submitted for the degree of Doctor of Philosophy of the
University of New England**

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DECLARATION

I certify that the substance of this thesis has not already been submitted for any degree and is not currently being submitted for any other degree or qualification.

I certify that any help received in preparing this thesis, and all sources used, have been acknowledged in this thesis.



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ABSTRACT

Canola (*Brassica napus*) production in Australia, although generally successful, is not well developed in the low rainfall environments of the eastern wheat belt. Whilst there are varieties being developed to allow increased canola production in these areas, there is limited understanding of the relationship between sowing time, variety, soil moisture and plant growth. The experiments detailed in this thesis set out to examine these issues and provide an understanding of which of these factors, or a combination of these, limit canola production in low rainfall environments.

Two field experiments were conducted comparing plant growth, yield and yield components and water use of several canola varieties sown across a series of sowing times, under two water regimes, one involving the application of supplementary water using irrigation. These were conducted during 2002 and 2003 at Condobolin in the central western district of New South Wales.

Sowing canola earlier than mid-late April as currently recommended (McRae *et al.* 2003), resulted in significantly higher plant growth (13% increase in dry matter production), water use efficiency (16% increase in grain water use efficiency), grain yield (28% increase) and oil concentration (5% increase). The early maturing canola varieties Ag-Outback, Ag-Emblem and Rivette produced significantly higher grain yields (up to 26% higher) when sowing was delayed beyond mid - late April, when compared with later maturing varieties. The later maturing varieties Hyola 60, Rainbow, Oscar, Ripper and Dunkeld produced significantly higher grain yields (up to 58% higher) when sowing was conducted in mid-late April as compared with late May and early June. Water use efficiency was increased by up to 65% and oil concentration by up to 10% when canola was sown in April rather than May or June, both significant improvements.

The results from this study illustrate that early sowing of canola in low rainfall environments of Australia could increase canola production and that correct varietal choice might further increase grain yields. However, caution must be extended when considering how much earlier canola should be sown than the current recommendations, as there may be other factors which could alter plant growth and yield that were unable to be investigated in this thesis.

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