GENOTYPIC VARIATION OF DORMANCY IN WHEAT

(*Triticum aestivum L.*)

A Thesis presented in partial fulfilment of the
requirements for the degree of

Master of Agricultural Science

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1996

Abstract

Embryo dormancy and α - amylase dormancy are desirable in wheat to minimise pre-harvest sprouting damage. The current work focuses on the embryo and graincoat colour.

A loose association between grain redness and dormancy in wheat is common knowledge. But the causal relationships between colour and dormancy are not clear and need to account for dormancy variability in the gene - pool. The study's working hypothesis was that colour formation triggers hypo - oxia synthesis of ABA (*vs.* gibberellins) which triggers dormancy if the timing with embryo development is optimal.

Development profiles for eight attributes (including dormancy) of grain were investigated from five white and five red wheat cultivars representing a wide genetic base. Tagged ears were sampled from pollination to harvest ripeness (days after pollination to 12.5 % moisture). All the white - grained cultivars did not have dormancy at harvest ripeness, and there was considerable variation of dormancy levels in the red - grained cultivars. The total-grain abscisic acid was not associated with redness nor dormancy, and no evidence of ABA sensitivity could be found in cv. Brevor. The failure to detect the putative dormancy of cvs. Brevor and Kenya 321 was probably due to fine detail employed in the present work, but may also have been due to the single ripening environment used. Base α - amylase and flavanol levels did not contribute to the variation in embryo dormancy. Gibberellic acid insensitivity in the *Rht/Gai* genotypes was not expressed in terms of embryo dormancy. Examination of the profiles suggested that redness was necessary to permit dormancy, but that dormancy *timing* was independent of colour. This led to varying levels of dormancy at harvest ripeness. No association with ABA was evident, nor with colour precursor. However timing and duration of polymerisation (flavanol) development (hypo-oxia) did show a weak association with dormancy delay and level.

The new hypothesis suggests that colour formation hypo-oxia permits dormancy, but that its timing is flexible with respect to harvest ripeness. Broader genetic control (other than the Redness gene) is indicated. Heritability estimates indicated that timings, rather than levels, are more useful selection criteria. This included

embryo dormancy attributes, colour, and harvest ripeness. For plant breeders it suggested that grain sampled at harvest ripeness could be selected for dormanc as measured in this study.

ACKNOWLEDGEMENTS

I wish to thank:

Dr. I. L. Gordon, Senior Lecturer, Department of Plant Science, Massey University, New Zealand, without whose valuable guidance this thesis will not have been finished.

Dr. D. Woolley for his valuable help with the hormone analysis work.

The Seed Technology Centre, Massey University, for use of the facilities that were necessary in this work.

My wife for her encouragement and motivation in this study.

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1996

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES