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PREVIEW

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**Environmental stability of doubled haploid wheat lines and
inheritance of the blue aleurone trait in diverse wheat crosses**

Keppenne, Veronique Danielle, Ph.D.

The University of Nebraska - Lincoln, 1989

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PREVIEW

ENVIRONMENTAL STABILITY OF DOUBLED HAPLOID WHEAT LINES AND
INHERITANCE OF THE BLUE ALEURONE TRAIT IN DIVERSE WHEAT CROSSES

by

Veronique D. Keppenne

A Dissertation

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The Graduate College in the University of Nebraska

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Under the Supervision of Professor P. S. Baenziger

Lincoln, Nebraska

August, 1989

TITLE

Environmental Stability of Doubled Haploid Wheat Lines and Inheritance
of the Blue Aleurone Trait in Diverse Wheat Crosses

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ENVIRONMENTAL STABILITY OF DOUBLED HAPLOID WHEAT LINES AND
INHERITANCE OF THE BLUE ALEURONE TRAIT IN DIVERSE WHEAT CROSSES

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University of Nebraska, 1989

Advisor: P. S. Baenziger

This dissertation is comprised of two parts. The first part concerns the yield stability of doubled haploid wheat lines. The objectives of this study were to determine yield potential, environmental responsiveness, and agronomic characteristics of 44 homogeneous doubled haploid lines in comparison with a heterogeneous cultivar, 'Centurk' from which they were derived. The genotypes were tested in 10 environments located throughout Nebraska from 1985 to 1988. The mean yield of the doubled haploid lines was lower on average than that of Centurk. Significant differences in mean yield were detected among the doubled haploid lines. These lines had a significantly greater 1000-kernel weight compared to Centurk, but they were not significantly different on average for test weight, height, and flowering date. The response of the doubled haploid lines to different environments, based upon stability regression coefficients, did not differ from that of Centurk. Within the limitations of this study and under the environmental conditions of the Great Plains, homogeneous lines derived by anther culture are lower yielding but show the same response to changing environments as their heterogeneous parental cultivar derived by conventional breeding methods.

The second part of this dissertation concerns the usefulness of the blue aleurone trait as a genetic marker. UC66049, a spring wheat with a spontaneous translocation for the blue aleurone trait, was crossed to wheat cultivars to test the transmission of the trait and the intensity of the blue color in different genetic backgrounds. To evaluate this trait as a marker for hybridity, UC66049 was crossed to male-sterile red wheat lines. The blue aleurone trait segregated as if controlled by a single gene that was transmitted normally through the male and female gametes. Seeds with one dose of the gene were faintly blue and not always distinguishable from seeds without the gene. We concluded that the blue aleurone trait is a good genetic marker if one is willing to confirm the F_2 ratios with additional progeny tests. This marker is also useful in determining the amount of controlled hybridity as opposed to self-fertility and/or outcrossing in genetic male-sterile wheat lines.

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