"GENETICAL STUDIES IN THE GENUS PHALARIS"

by

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CONTENTS

A. GENETICAL CONTROL OF INCOMPATIBILITY IN PHALARIS COERULESCENS.

1. Introduction
2. Material
3. Pollen Grain Appearance as an Index of Incompatibility
4. Parent and Progeny Diallel Crosses
5. The Genetical Analysis
   (a) The scoring of the pollen grain ratios
   (b) The results of the parent-progeny intercrosses and their interpretation
6. Discussion
7. Summary
8. Acknowledgements
9. References

B. CENTROMERIC BEHAVIOUR OF THE UNIVALENTS IN TWO PHALARIS HYBRIDS.
Phalaris coerulescens is a diploid perennial grass which is highly self-incompatible. Incompatible pollen grains germinate normally but the pollen tubes do not grow very far into the styles and both pollen grain and pollen tube stain very darkly twenty-four hours after pollination. Compatible pollen grains and pollen tubes do not stain twenty-four hours after pollination. An examination of the compatibility interrelationships between two groups of progeny and their parents was made using pollen grain appearance as an index of compatibility. In order to slow down the process of flowering and to facilitate the use of this technique, flowering was induced in mid-winter by exposure to an artificial long day.

The results obtained in the study indicated that a novel form of genetic control of incompatibility was operating in Phalaris coerulescens. To explain the results, the following hypothesis was put forward. Incompatibility is determined by two independently segregating loci, each with a series of multiple alleles. A pollen grain is incompatible when both the incompatibility genes it carries are present in a style. This theory fully explained all the results obtained, and successfully predicted the results of a further cross. The number of plants studied however, was too small to distinguish
between independent segregation and loose linkage.

It is apparent from overseas work that a number of grasses may possess this identical system of genetic control of incompatibility, and the significance of this system and its differences from previously described systems are discussed.