

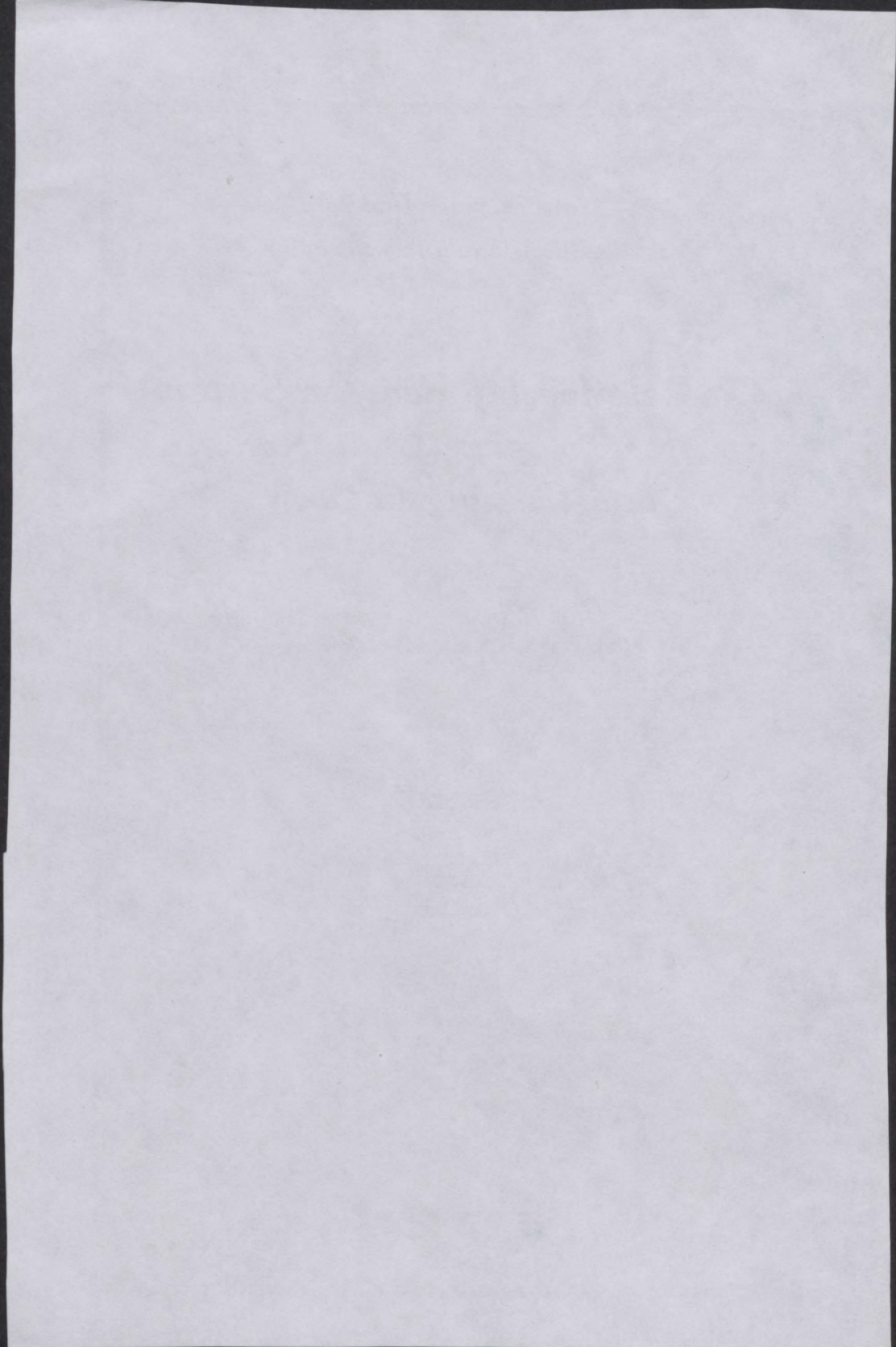
*University of Minnesota  
Agricultural Experiment Station*

*The Relationship Between Certain  
Morphological Characters  
and Lodging in Corn*

*D. M. Hall  
Division of Agronomy and Plant Genetics*



UNIVERSITY FARM, ST. PAUL



*University of Minnesota*  
*Agricultural Experiment Station*

***The Relationship Between Certain  
Morphological Characters  
and Lodging in Corn***

*D. M. Hall*  
*Division of Agronomy and Plant Genetics*

UNIVERSITY FARM, ST. PAUL

## CONTENTS

	Page
Introduction .....	5
Literature reviewed .....	5
Materials and methods .....	7
Experimental results and their interpretation .....	11
The determination of inherited differences and the uniformity of the expression of the characters in replicated plots .....	11
The correlations between the angle of lodging and the characters studied .....	16
The reaction of the characters in $F_1$ crosses .....	21
Summary .....	29
Literature cited .....	31

# THE RELATIONSHIP BETWEEN CERTAIN MORPHOLOGICAL CHARACTERS AND LODGING IN CORN<sup>1</sup>

D. M. HALL<sup>2</sup>

## INTRODUCTION

Lodged corn seriously interferes with harvesting operations and it assumes a new importance as the use of mechanical pickers increases. That lodging is the result of the interaction of the various environmental and inherited factors has been indicated by previous studies. No doubt corn is lost and the yield thereby reduced under farming practices when lodging occurs. However, the evidence does not indicate that a lodged stalk necessarily yields less than an erect one if none of the kernels are lost or rendered unfit for feed by being on the ground.

There are two types of lodging, the broken stalk type which occurs generally after the plants are mature and which is serious in areas where corn is picked from standing stalks, and the leaning type which results from weak anchorage and generally occurs between the last cultivation and harvesting time. The leaning stalk type is of particular importance in Minnesota where much corn is cut, and this study was limited to that type of lodging. Particular attention was paid to the various root structures which were assumed to be of importance in holding a plant erect in the face of wind and rain. It was important that these root characters be studied if synthetic lines of non-lodging corn were to be developed.

## LITERATURE REVIEWED

One of the first problems was to find a satisfactory method of classification for different degrees of lodging. Koehler (9) recorded plants leaning 30° from the vertical as lodged and disregarded those leaning less. Hayes and McClelland (4) placed plants in four classes, those leaning 0°, 20°, 40°, and 60°, and calculated a lodging index by multiplying the number of plants in each class by the angle lodged and dividing this sum by the total number of plants.

<sup>1</sup>A thesis submitted to the faculty of the Graduate School of the University of Minnesota in partial fulfillment of the requirements for the degree of Doctor of Philosophy. Degree granted June, 1934.

<sup>2</sup>The writer wishes to thank the Division of Agronomy and Plant Genetics of the University of Minnesota for making it possible for this study to be conducted and to acknowledge the assistance of Dr. H. K. Wilson as advisor, Dr. H. K. Hayes for critical analysis of the manuscript in preparation, and Dr. F. R. Immer for plans and procedures in the statistical treatment of the data, also Drs. Hayes and I. J. Johnson for furnishing the seed and previous lodging data.