Chapter 6

Genetics and Inheritance in Oats:
Inheritance of Morphological and Other Characters

NEAL F. JENSEN

I. Introduction

STUDIES ON THE genetics of oats are, almost by definition, activities of the twentieth century, although some earlier observations and investigations are pertinent to a review. Reviews of the literature on oat genetics have been made, of course, notably by Emme (1931), Matsuura (1933), Stanton (1936), and Ting (1945) and by several authors in textbooks and in reviews of the genetical literature on the inheritance of a certain character. In the present review the whole of the voluminous literature dealing with genetic and closely related studies of oats has been partitioned and dealt with according to character subject in chronological order. In the forepart of the section a certain amount of general or background information, which will be useful as an aid in understanding what follows, is presented. It was judged, also, that the broad subject of linkage might be presented in a more coherent and meaningful manner if the extensive literature were brought together and treated in one subsection, thus giving this study of relationships a central theme. Finally, a word of explanation must be made about the absence of a summary table listing the various known segregations, ratios, allelic pairs, and the like, for all of the characters of oats which have been studied. In the reviewer's opinion such a summation would endow data and interpretations, which have been obtained with varying degrees of precision, with equal reliability and a finality which is, in some cases, not justified. It is not possible to construct a table of this kind and convey to it weighting factors for the effects of influences peculiar to the material or environment, differences in size of populations, differences in elegance of technique, the nuances of interpretation, or even the expressed qualifications of the researcher.

The truly classic papers of Nilsson-Ehle (1908, 1909) are landmarks in the early European literature on the genetics of oats. In the United States, Norton (1907), Surface (1916), and Love and Craig (1918a) were among the early investigators. Preceding the studies along strictly genetical lines were others related to variability, hybrid vigor, natural crossing, and the origin and phylogenetic aspects of oat forms. The latter subjects, understandably, are still proper subjects for research and discussion. A brief review of a few of these subjects which bear closely on an understanding of genetics and inheritance studies follows.