CORRELATED INHERITANCE WITH SPECIAL REFERENCE TO DISEASE RESISTANCE IN SPRING WHEAT

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The plant breeder is interested primarily in the improvement of varieties of crop plants and for this purpose a knowledge of the manner of inheritance of different characters and their relations to each other is of vital importance.

The investigation described here was undertaken with a threefold purpose. First, to study with spring wheat the inheritance of field reaction to stem rust in a cross between a highly resistant and a highly susceptible variety. Second, to determine to what extent different types of rust reaction affect the shrivelling of the grain. Third, to learn the homozygosity of varieties as tested by their greenhouse reaction to physiologic forms 21 and 36.

REVIEW OF LITERATURE

INHERITANCE OF REACTION TO STEM RUST

The inheritance in wheat, under field conditions, of "mature plant" reaction to stem rust and of seedling resistance in the greenhouse has been studied by several investigators (7, 8, 9, 10, 13). The existence of a large number of physiologic forms appeared less serious from the standpoint of plant breeding when Aamodt (1) showed that the inheritance of resistance in the seedling stage to 11 physiologic forms was governed by a single pair of genetic factors.

After the discovery of physiologic forms, it was Hayes, Stakman, and Aamodt (11) who first demonstrated that certain wheat varieties and hybrids, though susceptible in the seedling stage under greenhouse conditions to some physiologic forms, showed a moderate degree of rust resistance under field conditions to many and perhaps all physiologic forms.

From the results of studies of several investigators (2, 7, 8, 9), it has become quite clear that the reaction of wheat varieties and hybrids in the seedling stage to single forms of rust as determined by greenhouse tests is not necessarily a criterion of the reaction under field conditions to these same physiologic forms or to a collection of forms.

INHERITANCE OF LIGULE

Studies of inheritance of liguleless condition in Gramineae are reported by Emerson (3) in corn and by Nilsson-Ehle and Love and...