CHANGES IN THE PROPORTIONS OF THE COMPONENTS OF SEEDED AND HARVESTED CEREAL MIXTURES IN ABNORMAL SEASONS

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The presence of mixtures in cereals and other crop seeds constitutes a problem not only to plant breeders, producers of "pure seeds", but also to commercial interests. These admixtures become troublesome especially when composed of closely related crops belonging to two or more market classes. Thus, a high percentage of the durum wheat seed used in the Great Plains area contains varying admixtures of hard red spring wheat. Admixtures of durum in hard red spring wheats are also common.

Under ordinary conditions of culture it is generally considered that the respective productive capacity of each of the components making up a mixture determines the differences between the relative proportions of the admixtures seeded and harvested. In this connection the capacities of production for such components must, however, be regarded in the light of a competitive capacity. A given plant forced into close competition with plants of differing growing habits may react quite differently than one competing with plants of its own kind. Great differences in the comparative producing capacities of components of mixtures may, of course, be expected in those particular seasons with environmental factors favorable, or in certain instances less detrimental, to one of the components than to another. Thus, the proportion of rye in a winter wheat-rye mixture will increase materially under conditions unfavorable to the winter survival of the wheat but not especially detrimental to the rye. Components of a mixture may either increase or decrease as environmental conditions may either favor or hinder them in their struggle with competing plants.

The experimental results to be reported were obtained at the South Dakota Agricultural Experiment Station at Brookings during the season of 1935. The particular growing conditions of the season of 1935 had much to do with the results obtained. Moisture and temperature relations were favorable to a heavy vegetative growth, especially during the early portion of the season. This led to a very succulent type of growth and the development of an exceptionally large number of tillers. By the first week of July one of the severest stem rust epidemics on record in the northern Great Plains area developed and progressed rapidly. Climatic conditions and the type of growth produced during the earlier part of the season were ideal for the development of stem rust. Consequently, all varieties of wheat, with the exception of certain special resistant varieties and selections, were severely damaged.

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