METHODS USED IN THE DETERMINATION OF RELATIVE AMOUNTS OF EAR ROT IN DENT CORN


Ear rot diseases of dent corn are among the most serious factors affecting both yield and quality of the crop throughout a major portion of the corn belt. While it is needless to dwell on data gathered by the Federal Grain Supervision which show the extent of low quality corn annually arriving at terminal markets, suffice it to say that, in 1926, when ear rots were especially bad, over 50% of all June receipts of corn arriving at terminal markets graded lower than No. 3 because of the factor “total damage,” mostly kernel rot, and that in the 9-year period, 1923-24 to 1931-32, approximately 33 per cent of the market receipts of the average corn crop had their grade determined as lower than grade No. 1 because of this factor.

The possibilities of obtaining marked improvement in quality through selection in inbred lines and the use of ear-rot resistant lines in hybrids has focused attention on the problem in recent years. Hybrids have been obtained among the high-yielding strains recently developed which are more resistant and others which are more susceptible to the ear-rot diseases than are the best of the open-pollinated varieties. It is the purpose of the present paper to describe certain aspects of the technic used in connection with the breeding for ear rot resistance as employed in the cooperative corn breeding program in Illinois.

CONSISTENCY OF REACTION UNDER NATURAL INFECTION

In breeding for resistance to disease it is essential that the plants be subjected to the disease under consideration so that differentials in host reaction are obtained. In some instances artificial inoculations have been found to be both desirable and necessary as a means of obtaining best differentials. In the case of corn ear rot a satisfactory inoculation technic has not been developed, and dependence has been placed upon natural infection for the annual occurrence of disease. Until more is known about the nature of resistance to ear rots and the complex relationships of factors which modify the expression of resistance are more fully understood, it appears doubtful if a simple method for determining relative resistance can be applied which will give results as useful as those obtained under conditions of natural infection.

The reliability of determinations of ear-rot reaction from natural infection has been repeatedly demonstrated under Illinois conditions.

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