

A TEST OF INDIANA VARIETIES OF WHEAT SEEDS FOR FUNGOUS INFECTION.

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"Indiana grows annually more than 2,500,000 acres of wheat. The average yield for the past ten years has been 15.1 bushels per acre. — *Op.* No. 23, Purdue University Agr. Exp. Sta.

The economic significance of any factor which plays a part in causing a decrease in the quantity of the yield, even though this decrease may be represented by a fractional part of one per cent. of the yield, is considerable. The mere presence, then, of internally infecting fungi in the wheat seed studied in the laboratory may be indicative of very important problems in the field.

In Bulletin No. 203 of the Ohio Agricultural Experiment Station, T. F. Manns has described a method for detecting fungi internally infecting wheat and other small grain. The method in brief, consists in sterilizing the outside of the grain by means of a solution of corrosive sublimate in 50 per cent. alcohol and then placing the seeds in sterile petri dishes on agar-agar. This allows germination of the plant embryo when viable. Cultures or growths of the fungi surviving internally in the seed develop at the same time. The fungi in these cultures can then be identified.

The results of laboratory tests at the Ohio station "show an amazing amount of disease transmission in seed wheat as well as the proof of scab infection by both germinating and dead wheat kernels." A study of field conditions showed "that many seedling wheat plants were killed by the scab fungus (*Fusarium roseum*) conveyed in the seed or retained by the soil." This verified the laboratory conclusions.

In the report of the botanist of the North Dakota Agricultural Experiment Station for 1911, Dr. H. L. Bolley concludes from the results of numerous tests of seeds that "our experiments, taken as a whole, tend to prove definitely that the soil is not often materially depleted, but that the deterioration in yield and quality of grain is more specifically to be assigned to troubles caused by internal seed infection and soil infection."

The genera of fungi which Bolley regards as being of pathogenic interest are *Colletotrichum*, *Fusarium*, *Helminthosporium*, and possibly *Macrosporium*.

In Circular No. 3 of the Purdue University Experiment Station the statement is made that "the average (yield of wheat) on the station farm for the past twenty-five years has been 28.04 bushels per acre." This is nearly thirteen bushels above the average for the state.

The question naturally arises, knowing the results obtained elsewhere by studies of the internally infecting fungi of seed wheat, whether Indiana varieties taken at random from a single locality may be similarly infected?

Following the method used by T. F. Mams, thirty-four different varieties of wheat seed were tested by me. I shall summarize briefly the results of the test and hold them tentatively against further studies on both the wheat plants and seed.

Of the thirty-four varieties, fourteen were free from fungi of any kind. Thirteen of the varieties were found to be infected with a *Fusarium*. Four of the varieties showed an internal *Macrosporium*, and three varieties showed both a *Fusarium* and *Macrosporium* infection.

The meagerness of these data, however, precludes the formation of any definite conclusions, but does indicate a fertile field for study.