

STINKING-SMUT OF WHEAT.

II. FIELD EXPERIMENTS ON CONTROL.

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A PRELIMINARY article on stinking-smut of wheat appeared in the *Journal* for September, 1923. It contained a brief account of the available knowledge of the disease and the results of laboratory experiments with certain treatments in control. The present article records the results for 1924-25 of comparative trials in the field of sixteen of the most successful seed-treatments used in this and other countries for the control of this disease.

GENERAL PLAN OF EXPERIMENTS.

Four varieties of wheat were used in the experiments—Pearl, College Hunter's, Purple-straw Tuscan, and Solid-straw Tuscan. The last-named was harvested in January, 1924; the other three were one year older, being in fact the same parcels of wheat from which the samples used in the 1923 experiments, referred to above, were taken. All had been machine-threshed in the usual manner, and, for the purpose of these experiments, were inoculated in bulk with one part of smut-spores to 750 parts by weight of seed. The sample of smut consisted of *Tilletia Tritici* (Bjerk.) Wint. only, and had been collected by the writer at Winton in February, 1924. Samples of the four wheats were separately put through the various treatments in as identical a manner as possible—300 seeds from each sample being put to germinate* in the laboratory at approximately the same time as the remainder were being sown at the Ashburton Experimental Farm. The Pearl and the Hunter's were sown in the autumn, the Purple-straw and Solid-straw Tuscan in the spring. The ground used for the experiments had not carried wheat for at least seven years. The seed was sown in rows $5\frac{1}{2}$ yards long, with 1 ft. between rows, each row taking 100 seeds spaced 2 in. apart. A piece of flexible wire rope, with permanent marks at each 2 in. and a spliced loop at one end, was used both to line out the drills and to locate the exact position for each seed—the latter being sown by hand. This method is quick and accurate, since, the seed being visible during the whole operation, mistakes are readily noticed. The exact position of each seed is also found at any subsequent time by slipping the loop over the permanent marker-peg and stretching the rope along the row. Thus in the subsequent counting operations each row may be divided into any desired number of subdivisions to facilitate statistical examination of the results. In the experiments recorded here the 25, 50, and 75 marks were given extra prominence, thus dividing each sown row of 100 seeds into four equal parts. Each treatment was given four rows, a total of 400 seeds, and the results recorded separately on each of the sixteen divisions thus made and calculated as percentages on twenty-five seeds. The Probable Error of each of the mean results tabulated was computed on these lines, but, since statistical examination

* All the laboratory germinations here recorded were carried out by the Seed Analyst, Mr. N. R. Foy, and his assistants, Messrs. Cooch and Traill.