

In recent years two other promising methods for the disinfection of seed have been discovered—a dry treatment with copper-carbonate dust, introduced by Darnell-Smith in New South Wales in 1917, and a wet process using certain organic mercury compounds (uspulun, germisan, chlorophol, &c.), which has given good results in Germany, and which it is hoped to test here when supplies of the compounds become available. The copper-carbonate dry-dusting treatment of Darnell-Smith offers many practical advantages over any of the wet methods, and it is claimed for it that germination is rather increased and strengthened even after prolonged post-treatment storage. While showing good results in the recorded experiments on smut-control, there appears to be some doubt as to whether it is as effective as the formalin or bluestone. This can only be settled for local conditions by careful field experiments in the wheat-growing areas of New Zealand.

The present high cost of copper carbonate—about 6s. per pound—is a distinct disadvantage, though it is expected that if the demand increases the cost of production will be considerably reduced. Used at the standard rate of 2 oz. per bushel of seed the cost of treatment will be 9d. per bushel, as against 3d. per bushel by the present methods. Still, if by using copper carbonate the rate of sowing can be reduced from $1\frac{1}{2}$ to $1\frac{1}{4}$ bushels per acre—representing 1s. 6d. at 6s. per bushel—at an increased cost of $6\frac{3}{4}$ d., then there is a net gain of $11\frac{1}{4}$ d. per acre in addition to the convenience and ease of handling.

Another dry treatment, using a mixture of anhydrous copper sulphate and limestone, has given fairly good results in the United States, and it has the advantage of being considerably cheaper in cost of material.

The usual farm practice in New Zealand is to treat the seed-wheat with either bluestone or formalin, which, although giving fairly satisfactory results in the control of smut, is considered to reduce germination to such an extent that an additional 10 to 20 per cent. of seed must be sown to ensure the requisite stand.

Taking the total seed-wheat used in New Zealand at 400,000 bushels, the annual loss due to this excess sowing is from 40,000 to 80,000 bushels. At 6s. per bushel this represents a cost to the growers of from £12,000 to £24,000 per annum. The primary object of the present investigation is to find how this wastage may be reduced or perhaps eliminated.

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PRELIMINARY LABORATORY EXPERIMENTS.

These experiments were planned to give reliable data on one factor only of the stinking-smut problem—that of the actual effect on wheat-seed, germinated under ideal conditions, of the more promising standard