

Fertilizer Tested

Rabotnichesko Delo, Sofia, 17 Sep 1951

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✓ A new method of phosphate fertilization which achieves high yield-increase with small quantities of fertilizer has been developed and tested in recent years at scientific research institutes and on cooperative and state farms in the USSR. Five to 10 kilograms of superphosphate used according to this method produces the same yield-increases as 20 to 30 kilograms of superphosphate used by the old method of fertilization.

✓ The new method, which became known as "sowing-time row-fertilization with granulated superphosphate," is characterized by a preliminary granulation of a mixture of ordinary powdered superphosphate and well-decomposed organic fertilizer. Subsequently, a mixture of seeds and fertilizer is sown from a multiple sowing machine. It has been established that in the first year plants can use only about 20 to 25 percent of fertilizer spread by the old method, while 80 to 90 percent of granulated superphosphate introduced into the soil by rows and at the time of sowing goes into the crops.

✓ For two years this method of fertilization has been the subject of experimentation in the fields of the "Stalin" Agricultural Engineering Station (ATZ) near Sofia, and in that period valuable data have been obtained on its great advantages over the old method of dispersed fertilization with powdered superphosphate, as well as on the preparation of the granulated fertilizer.

✓ The following results were obtained at the above-mentioned station from field tests comparing the new and the old fertilization methods:

- 1 -

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**CONFIDENTIAL**✓ Grain Yield, Kilograms Per Acre

1. Without fertilizer	210
2. Dispersion fertilization with 25 kilograms of powdered superphosphate per acre	302
3. With 10 kilograms of granulated fertilizer per acre, under the new method	288

✓ The average increase in yield per kilogram of fertilizer used is 3.68 for the old method and 10.1 for the new method.

✓ At the price of 24 leva per kilogram of superphosphate, the fertilizer repays, in the first case, 28 leva per kilogram, and in the second case, 242 leva per kilogram.

✓ According to these figures, the same amount of fertilizer used by the new method will fertilize three times as large an area, all other production factors being equal.

✓ The figures from last year's experiments closely agree with these results. This time 1 kilogram of ordinary powdered superphosphate gave an increase in yield of 3.35 kilograms, as against 0.85 kilograms for granulated superphosphate.

✓ From these data we may conclude, that, in view of the limited quantities of superphosphate available, wheat must be fertilized exclusively by the new method, and that to waste fertilizer by using the old method is absolutely unjustifiable in the cultivation of this vital crop.

✓ Other experiments carried out this year showed the correct

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proportions of organic fertilizer to superphosphate, the correct size for the granules, etc. On the basis of this research, we recommend that the fertilization of wheat be carried out as follows: *(See Source)*

The preparation of the granulated superphosphate is carried out by the farmers themselves. The necessary ingredients are dry, well-decomposed organic fertilizer (dung) and ordinary superphosphate. The organic fertilizer first is dried (if moist), crumbled, and passed through a sieve with openings of about 1 centimeter. The superphosphate is passed through a sieve with openings of 2 to 5 millimeters. Equal portions by weight of these sifted substances are then mixed. The mixing is carried out on an ordinary cement or wood floor by means of a shovel, iron rake, etc. Next, the mixture is spread out in layers of 5 to 8 centimeter thickness and soaked with 20 to 30 percent by weight of water, for which a watering can is to be used. The addition of the water should be done evenly on successive batches of the mixture, and the latter well mixed with rakes.

The addition of water should be discontinued when, during the mixing process, granules of 3 to 7 millimeters in size appear. The mixture should now feel moist, but not yield water upon being squeezed in the palm of the hand. If the mixture contains too much water, the granules formed will be too big, while if insufficient water has been added, the mixture remains powdery. To an over-moistened mixture additional dry material must be added, while a too-dry mixture is treated with more water. It is recommended that the water be partially or totally replaced by fertilizer liquid if possible, in which case the granulated organic-mineral fertilizer will be even higher grade.

- 3 -

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The moistened, well-mixed, grainlike fertilizer mixture is next passed through a disinfectant mixer, where the granulation is carried to completion. The mixer is filled to 1/5 capacity with moistened fertilizer and rotated at 35 to 40 revolutions per minute for 5 to 10 minutes. This time is usually sufficient for satisfactory granulation of the mixture. In practice, completion of the process can be judged by the ease of rotation and the sound of the granules striking the sides of the rotating mixer. Lastly, the fertilizer is unloaded from the mixer, spread out in thin layers and left to dry, preferably in the sun. The drying takes 1 to 3 days. The dry granules are well hardened, but differ in size.

Soviet experience, as well as our own, shows that the size of the granules exerts a definite influence on the yields from the fertilized crops. Both sets of data show that the most effective size for granules used in this method of fertilization is 2 to 5 millimeters.

In use, the granules of superphosphate are mixed with the seeds immediately before sowing. If the seeds remain in direct contact with the fertilizer for a prolonged period (that is, several days), their germinancy decreases.

✓ In sowing-time row-fertilization with granulated superphosphate, 10 kilograms of fertilizer are used per acre.

✓ In setting the multiple sowing machine for the sowing of the seed-fertilizer mixture, the procedure is the usual one, the amount of fertilizer being added to that of grain. Thus, if 16 kilograms

- 4 -

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/ of wheat seed plus 10 kilograms of granulated superphosphate are to be sown per acre, the machine is set for 26 kilograms of mixture per acre.

√It must be added that this method of sowing-time row-fertilization of wheat gives best results in the chernozem regions of Northern Bulgaria and the peaty soil in Thrace and around Sofia.

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- 5 -

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