Spread super for cereal crops

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"SPREAD SUPER" FOR CEREAL CROPS

Broadcast superphosphate is not used efficiently by cereal crops. Much higher rates of application must be used to give the same results as super drilled in with the crop.


THE use of bulk superphosphate broadcast direct on to the paddocks is a new method of reducing fertiliser costs. But it has long been known that broadcasting phosphate is less efficient than drilling it in with the seed. The experiment reported here was designed to demonstrate this point.

The practice of drilling superphosphate with seed was started by Sir J. B. Lawes in England as early as 1843.

Mixing other artificial fertilisers with superphosphate soon followed, but when heavy rates of these mixtures were used, germination and early growth of crops were reduced. By taking out those fertilisers injurious to germinating seeds and broadcasting them separately, better crops were grown. Machines to broadcast these fertilisers evenly were evolved.

Later, no advantage was seen in retaining the practice of drilling the superphosphate. This was then broadcast with the other fertilisers for crop growing, a practice which continued until the Second World War.

The value of superphosphate for wheat production in Australia and North America was recognised at the turn of this century. The need arose for a means of applying it conveniently and easily over extensive areas, and this led to the production of drills which planted the seed and applied the super in one operation.

This machine was not originally designed to give efficient use of the fertiliser by the crop, but luckily the placement of phosphate with the seed proved very satisfactory in this respect.

The efficiency of this machine was recognised in England during World War II. It was used fairly extensively when large areas of phosphorus deficient grassland were ploughed up for cereal production. There has, in the country, been a swing away from broadcasting to drilling as the best means of applying phosphate to crops.

In Western Australia, where super has nearly always been drilled for cereal growing, there are increasing signs of a reversal to broadcasting. Valuable time is saved at seeding time if the super is broadcast beforehand. With more super now being handled in bulk, it is often more convenient to topdress it onto paddocks to be cropped as soon as it arrives on the farm (usually before the opening rains), than to store it for use later. This gives advantages of bulk handling on the farm and saves valuable storage space.

The advantage of drilling super with the seed rather than broadcasting it has been widely and conclusively proved. However, as the practice of broadcasting is growing, it was decided to demonstrate the relative efficiencies of different methods of applying the fertiliser.
THE EXPERIMENT

The experiment was located on the property of Mr. W. Shepherd, Narrogin. It was sown on a clover paddock cleared in 1947, which had received a total of 800 lb. of super per acre since clearing.

Three methods of applying the superphosphate were tested—

- Broadcast before ploughing (April 12, 1960.)
- Broadcast after ploughing and scarifying back (May 23, 1960).
- Drilled with the seed (June 8, 1960.)

All plots were seeded on June 8.

The rates of super used were:

1. Nil.
2. 20 lb. per acre.
3. 40 lb. per acre.
4. 80 lb. per acre.

All plots were sprayed with manganese sulphate solution on August 22 to correct a manganese deficiency.

Results:

Drilling with the seed was significantly better than either of the other methods of application. Broadcasting the super before the paddock was ploughed gave the same yields as broadcasting after the paddock was ploughed and worked back.

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<th>TABLE 1.—Yield of Wheat (Bushels/acre) from Different Rates and Methods of Application of Superphosphate—</th>
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<tbody>
<tr>
<td>Rates of Super</td>
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<td>lb/acre.</td>
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<td>20</td>
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<td>40</td>
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<td>80</td>
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<td>Average:</td>
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When no super was used the yield was 15.9 bushels/acre.

Note:—As there were no differences in yield between the two broadcast treatments, only the average broadcast yield is shown.

A drop in yield of about three bushels an acre resulted from broadcasting the super rather than drilling it.

It must not be forgotten that this experiment was on land that had received considerable amounts of phosphate in the past. A yield of nearly 16 bushels an acre was obtained without using super.

On newly cleared land, and using higher rates, greater differences between the methods of application would have been obtained. On old land that has received a greater total quantity of super, the differences between the methods of application would be much less than those in this experiment.

Because broadcasting is less efficient than drilling, it is logical to reason that by broadcasting higher rates of super than normal, the same yields should be obtained as from the drilling of normal rates. In practice this has proved to be so.

Experiments in England and the United States of America have indicated that about twice as much phosphate is needed when it is broadcast compared with when it is drilled.

In our experiment, 80 lb. per acre broadcast was almost as good as 20 lb. per acre drilled. If super has to be broadcast for cropping it should therefore be quite profitable to at least double the proposed rate of application. Not only would yields be increased, but part of the additional super would be available to pastures and crops in future years.

The experiment also showed that on land with a history of over 800 lb. of super applied, increasing rates of superphosphate up to 80 lb. per acre gave profitable increases in yield. It is very likely that yields would have been further increased by higher rates.

Taking the price of super landed on the farm at £14 10s. a ton and wheat at 12s. a bushel, 100 lb. of super needs to give only one bushel increase in yield to pay for itself.

IN BRIEF

- When broadcast, super is not as efficiently used by a cereal crop as when it is drilled with the seed.
- If superphosphate is broadcast much higher rates should be used for cereal crops.
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