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Results from Recent Research

Urea Drilled with Seed Affects Germination and Yield

By M. G. Mason, A. Loutit, J. A. C. Smith, D. Highman and P. Stallwood

Trials in 1968 at Burracoppin and York again showed it is safer to topdress urea just before seeding than to drill a mixture of seed and urea. At all but the lowest urea rates, urea drilled with the seed reduced the number of plants emerging and surviving, and reduced final wheat yields.

Earlier work* has shown that urea mixed with seed, either in the seed box or in the tubes, may reduce or delay germination of wheat seed. The harmful effects are most likely where there is just sufficient moisture to cause germination. Under such conditions free ammonia released from urea in contact with the seed affects germination.

Where there is ample soil moisture the seeds germinate satisfactorily as most of the released ammonia is dissolved and is not harmful to the seedlings.

This work was carried out to further investigate the effect of drilling urea in contact with wheat seed, and to test the effects of different rates of urea application.

Method

Two trials were planted on May 22, 1968, about seven days after the opening rains.

At Burracoppin, a two acre trial was sown as a first crop on old non-clover land where the general rate of urea recommended was about 40 lb. per acre. A four acre trial at York was a second successive crop on old non-clover country where the urea recommendation was 60-65 lb. per acre. Both trials were sown to Gamenya wheat drilled with 90 lb. (Burracoppin) and 120 lb. (York) of superphosphate.

Germination counts for each trial were made by counting the numbers of wheat seedlings in 60 ft. of row.

Results

Results of both trials are summarised in Figures 1-4. Burracoppin

Figure 1 indicates that urea topdressed before seeding had no effect on germination whatever the rate of urea applied. Similarly, Figure 3 indicates that increasing rates of urea topdressed before seeding brought increasing wheat yields up to the highest rate used in the trial.

When the urea was drilled with the seed it reduced germination as indicated by Figure 1. The reduced germination caused lower yields at all urea rates, especially those over 100 lb. urea per acre.

York

Urea drilled with the seed at York also reduced germination up to the maximum rate of urea used. As at Burracoppin, the reduced number of seedlings at York caused yield reductions, particularly at the higher rates of urea.

Discussion

Although both trials were planted into a moist seedbed,


they did not receive further rain for about eight days after seeding. It is under such conditions that the effect of urea placed in contact with the seed is most likely to occur.

Urea is commonly placed in contact with the seed by one of two methods; mixing the urea with the seed in the seed box, or spreading the superphosphate beforehand and placing the urea in the super box. Either method places the urea in contact with the seed in the soil.

The results clearly indicate that it is much safer to topdress urea just before seeding than to drill the urea in contact with the seed. The risk of lowering both germination and yield is also increased as the rate of application rises.

Acknowledgments

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![Figure 3](Image3.png)  
Figure 3.—Yield effect of urea drilled at seeding—York

![Figure 4](Image4.png)  
Figure 4.—Yield effect of urea drilled at seeding—Burracoppin