EFFECTIVENESS ON COTTON SOILS OF GRANULATED
MIXED FERTILIZERS OF DIFFERENT PARTICLE SIZE

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The manufacture of fertilizer materials and fertilizer mixtures in 
grains of approximately uniform size and shape has received 
consideration as a means of improving their physical properties. 
This need has become more pressing with the increased amount of 
fixed nitrogen used in fertilizer mixtures. Many of these newer pro-
ucts are hydroscopic in nature and lack the conditioning effects of 
the natural organic nitrogen carriers which they are replacing.

Ross and Hardesty and their associates (3, 4, 8, 9), who have de-
veloped methods for the production of mixed fertilizers of different 
particle size, have pointed out that granulation of fertilizer mixtures 
reduces caking, prevents segregation, improves the drillability of the 
mixture, decreases handling charges, eliminates the necessity of using 
high priced conditioners, and is advantageous in preventing the loss 
of nitrogen that results when ammoniated mixtures containing 
dolomitic limestone are in storage. Granulated fertilizers of uniform 
particle size have an added value in that they can be distributed more 
uniformly by the common type of fertilizer distributor.

Other factors of interest include the movement and reaction in the 
soil solution of the nutrients in granulated fertilizer of various particle 
size, their effect on seed germination, rapidity of plant emergence 
above ground, plant viability, and crop yield. In this paper the results 
of field experiments with cotton and laboratory studies on some of 
these factors are considered. Preliminary informal reports have 
previously been made (1, 2, 5, 6, 10). Mehring and his associates (7) 
have reported the results of some agronomic experiments with granu-
lated fertilizer mixtures applied to cotton in 1931–33. Their data 
show little difference in yield resulting from use of different size 
particles of three fertilizers tested. However, the smaller size granu-
lated fertilizers of their experiments, as an average, gave slightly 
larger yields.

EXPERIMENTAL PROCEDURE

The fertilizer used in these experiments was a 6–8–4 (N-P₂O₅-K₂O) analysis 
prepared from 4 units of ammonium sulfate, 2 units of urea, 8 units of super-
phosphate, and 4 units of potassium chloride. Sufficient dolomitic limestone was 
incorporated in the mixture to make it non-acid forming.

Approximately 2.5 tons of fertilizer were prepared for these experiments over 
a period of 3 years. The dry materials were mixed and ground to pass a 40-mesh