NUTRITIONAL FACTORS AFFECTING COTTON RUST

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A NUTRITIONAL disease known as cotton rust is widespread throughout the Cotton Belt. In advanced stages it causes severe loss to the farmer in at least three ways: (a) A poor quality of cotton is produced because the bolls open only partially, the wet lint dries slowly and molds develop; (b) much of the cotton is left in the field because it is difficult to pick; and (c) the yields are usually lower than those obtained from cotton that is free of rust.

At the time this project was started in 1937, it was fairly well established that cotton rust was associated with a deficiency of potassium. However, in certain fields of cotton badly affected with rust, a double application of Chilean nitrate of soda completely eliminated the rust where applied to a portion of the field. This indicated that minor elements in sodium nitrate might be playing an important part in retarding the appearance of cotton rust. In some experiments on the Alabama substations, cotton fertilized with ammonium sulphate as the source of nitrogen rusted much more readily than adjacent plots fertilized with sodium nitrate. In fact, on certain soils, such as the Clarksville series, the use of ammonium sulphate as the source of nitrogen is avoided by many farmers because they believe that it increases the severity of cotton rust. Cotton that received large amounts of phosphate frequently rusted more severely than cotton on adjacent plots that received less.

It had been observed, also, that in many cases cotton rusted badly when planted on land from which peanuts had been dug frequently. These and other observations led to the decision to undertake a study of the factors affecting the development of cotton rust. The results of this investigation are reported herein.

EFFECT OF MINOR ELEMENTS ON COTTON RUST

During the summer of 1939, a total of 21 tests were started on fields of cotton known to be subject to severe cotton rust. Three 1/40-acre plots were laid off on each farm. Plot 1 received B, Cu, Mn, Zn, and Mg; plot 2 received the same as plot 1, except that Mg was omitted; and plot 3 received no minor elements or Mg. The elements were applied as follows: 10 pounds each of borax, copper sulphate, manganese sulphate, and zinc sulphate, and 160 pounds of magnesium sulphate. All three plots were fertilized uniformly with whatever fertilizer the farmer happened to be using.

The average yields for all the tests showed that minor elements gave an increase of 32 pounds of seed cotton per acre, and magnesium gave an increase of 88 pounds per acre. The development of cotton rust was observed four times during the season, and there was...