PLANTS growing in a soil obtain potassium from the soil solution, exchange material, other secondary as well as primary minerals, and organic matter. A great many workers (1, 2, 3, 4, 5, 6, 7) have investigated or developed methods of extracting and determining the amount of potassium in a soil that may be available to plants. From the data obtained, attempts have been made to show a relationship between the potassium thus extracted from the soil and the need for potassium fertilization. For a number of crops and soils there appears to be a close relationship between yield and exchangeable potassium. Since the equivalent of about 45,000 tons of muriate of potash is used annually as a fertilizer in Alabama and since about 70% of this is used for the growing of cotton, a study was undertaken to determine whether any relation exists between exchangeable potassium in Alabama soils and the response of cotton to potash fertilization.

During the years 1937 to 1940, inclusive, 113 cooperative tests were conducted by the Alabama Agricultural Experiment Station for the purpose of studying rates of potash fertilization for cotton in certain cropping systems. These tests covered a wide variety of soils and revealed that 94% of the soils responded significantly to the first increment of 25 pounds of potash per acre. The average increase in the yield of seed cotton for this increment was 195 pounds per acre. On the other hand, only 55% of the soils responded significantly to a second increment of potash, and the average increase in the yield of seed cotton from this was 62 pounds per acre. In another investigation involving 283 cooperative tests, it was found that 41% of the soils responded significantly to a second increment of potash (25 pounds of K₂O per acre). No information was obtained regarding the response to the first increment of potash since all plots received at least 25 pounds of potash per acre.

RELATION OF EXCHANGEABLE POTASH TO YIELD OF SEED COTTON

The data used in the present study were obtained from the sub-stations and experiment fields of Alabama. These fields were selected because of the uniformity of the physical composition of the soil, level topography, and the importance of the soil type as an agri-