THE correct placement of fertilizers in relation to the seed and plant is recognized as an important factor in obtaining maximum fertilizer responses. Although there are various types of machines that do a good job of applying fertilizers several inches from the seed at planting, data which show the effects of improper placement remain important and have definite value. The factorial design of these experiments allows evaluations of main effects and interactions which are not ordinarily possible. The data are of greatest practical value to agricultural workers of the area, but they also add needed quantitative evidence to the general literature on the subject of fertilizer placement influences.

MATERIALS AND METHODS

Factorial fertilizer experiments and fertilizer-spacing experiments were conducted on Austin clay and Houston black clay at the Blackland Experiment Station in 1950. These soils are predominant in the Blackland Prairie Region of Texas. At the experimental sites they are medium to very dark-colored clays which have 25 to 40% calcium carbonate equivalent. Randomized block experiments with four replications were used in all experiments.

Identical experiments were conducted on Austin and Houston black clay in which the fertilizers were applied with the seed at planting. Fertilizer treatments included 4 rates of ammonium nitrate (32.5% N)—0, 100, 200, and 300 pounds per acre; 3 rates of superphosphate (20% \(P_2O_5\))—0, 150 and 300 pounds per acre; and 2 rates of muriate potash (60% \(K_2O\))—0 and 100 pounds per acre. Since the paper deals with the effect of injury to the seedlings during germination, rates of the various fertilizer materials will be of the more conventional method of rates of \(N\), \(P_2O_5\), and \(K_2O\). The fertilizer materials were applied in freshly opened furrows on March 15; corn was seeded 18 inches apart in the same furrow with and the seed and fertilizer were covered to a depth of 2 to 3 inches.

Another factorial experiment grown on Austin clay involved fertilizer rates and different plant populations. Fertilizer materials were not applied with the seed but were applied in the furrow in early December, the land rebedded and allowed to remain undisturbed until planting on March 15. Fertilizer treatments included 3 rates of ammonium nitrate (32.5% N)—0, 130 and 260 pounds per acre; 2 rates of superphosphate (20% \(P_2O_5\))—200 and 400 pounds per acre; and 2 rates of muriate of potash (60% \(K_2O\))—0 and 100 pounds per acre. Corn was seeded at a thick rate and thinned to the desired plant populations of 14,520, 9,680, 7,260 and 5,810 plants per acre.

Total rainfall received from Jan. 1 to Mar. 12 was 5.7 inches. No additional moisture was received until April 2. Mean temperatures for the 21-day period from March 12 to April 2 averaged 64° F. which is several degrees higher than the 37-year average for the same period. Adequate moisture was received during the early growing season but became deficient after silking, thus limiting yields.

Stand counts were made at silking the first week in June. Plots were harvested by hand on Aug. 16 and 17.