Infiltration of Low Sodium Irrigation Water Into Soil With Dense Layer, in Relation to Treatment With Gypsum and Other Materials

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GRADUAL reduction in rate of water penetration into different soils under irrigation has been experienced for many years in parts of the San Joaquin Valley of California. The difficulty has been particularly marked in the early potato and cotton region in the southern part of the Valley, in the vicinity of Bakersfield.

Earlier experiments (17, 18) with basin irrigation on uncropped plots had suggested that large applications of ammonium sulfate in combination with irrigation water of low calcium content were responsible, on a soil of the Hesperia series, for reduced rates of water infiltration, and that applications of organic matter or gypsum would increase infiltration rates. No special use is made of crop residues and farm manure is scarce in the region concerned. It is now very common practice among potato growers, however, to apply gypsum to their soils in an attempt to increase infiltration rates, although information concerning soil and water properties is not always obtained beforehand.

PLAN OF EXPERIMENT AND CHOICE OF AREA

In 1941 it was decided to undertake field infiltration experiments in order to learn more of the soil and water interrelationships associated with the problem which has been outlined. Some time was spent in visiting potato and cotton growers and discussing with them their soil conditions, cultivation practices, quality of water supply, and irrigation experiences for the purpose of selecting an area and conducting experiments where the water penetration problem was particularly severe. It was desired to continue the work, under close control, for several years. Unfortunately, no farmers were found who would agree to release even a small portion of their land for more than a single growing season. If continuing experiments were to be conducted, it was evident that other plans must be made and it was finally arranged, with the permission of the Station Superintendent, to conduct the experiments on an area of Hesperia sandy loam situated on the U. S. Cotton Experiment Station near Shafter, Calif.

It was considered particularly important that the infiltration measurements be made in the presence of growing crops and that soil treatments be incorporated, so far as possible, with the standard management practices used in the district. Times of planting, methods of cultivation, method and frequency of irrigation were all planned in accordance with this principle. On this account measurements...