SUBSOIL MOISTURE AND CROP SEQUENCE IN RELATION TO ALFALFA PRODUCTION

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In two previous papers, the authors have shown the striking depletion of subsoil moisture as a result of the prolonged cropping of land to alfalfa with a consequent decline in yields, and also the relatively low yields of subsequent plantings of alfalfa through failure of the subsoil moisture to become restored under ordinary cropping conditions. This raised the questions whether the restoration of subsoil moisture might be profitably accelerated by special cultural treatments preliminary to reseeding with alfalfa, and whether some other legume might be grown to better advantage where the subsoil moisture has become depleted. Five years of additional data bearing on these questions have been secured, which it is the purpose of this paper to report. A state-wide survey of depletion and restoration under common cropping practices has been conducted cooperatively with the Division of Forage Crops and Diseases, U. S. Dept. of Agriculture. The results of this survey will be published in a subsequent paper.

PLAN OF EXPERIMENTS

The site of the experiments was field "B" of our previous study on the Experiment Station farm at Lincoln. Originally, this was a portion of a larger field that had been cropped solely to grain for about 50 years. In 1922 it was seeded to alfalfa, with the exception of a central strip 20 feet wide which was planted at the same time to brome grass. In the fall of 1927 it was found through soil moisture sampling that the alfalfa land had become thoroughly depleted of available moisture to depths well beyond the fifteenth foot. The land in brome grass, on the other hand, had lost very little moisture below the sixth foot. In the spring of 1928 the brome grass and part of the adjoining alfalfa were plowed and laid off into 1/20-acre plats for use in these investigations. Since previous experience with this land had indicated a high degree of uniformity, it was believed that...