

Eight to 10 sub-samples at three depths, 0-9 inches, 9-21 inches and 21-33 inches, were taken from each 1/30 acre plot. The sub-samples were taken at different points over the plots and in the middles between the rows after the land had been prepared for planting. This procedure removed the area of sampling as far as possible from the zone where commercial fertilizers had been applied. All sub-samples from one depth were thoroughly mixed and the composites sampled and analyzed.

The nitrate content of the moist soil was determined in a 1 to 5 soil-water extract on the date of sampling. The soil suspensions were filtered through qualitative filter papers and the nitrate determinations made on the clear filtrates by the phenoldisulphonic acid colorimetric method. The moisture contents of the soils were determined by weighing out samples and allowing them to air dry in the laboratory. The nitrate content of the samples was calculated to milligrams of nitrogen as nitrate per 100 grams of air-dried soil.

From the results of the determinations of the nitrate content of the soil of the plots of the different rotations, the following studies have been made: (a) The accumulation of the nitrates in the different soil depths as influenced by the distribution of rainfall during the growing seasons of sweetpotatoes and corn. (b) The influence of plowing under of different summer cover crops on the accumulation of nitrates in the soil.

In making these studies the results of the nitrate determinations of the soil samples from the corn and sweetpotato sections have been averaged for each date of sampling. No attempt has been made to determine the comparative effect of corn and sweetpotatoes on the nitrate content of the soil, due to variations in the yields of the individual cover crops on the plots of the two sections and to other uncontrolled factors. Graphs have been used to show the nitrate content of the soil at the different sampling dates since the actual data are very extensive.

EXPERIMENTAL RESULTS

(a) Accumulation of nitrates in different soil depths as influenced by distribution of rainfall. The nitrate content of the different soil depths of all plots for each date of sampling in 1927 and 1928 have been averaged in these studies. The average nitrate contents in three soil depths, 0-9 inches, 9-21 inches and 21-33 inches, for each date of sampling during 1927 and 1928 are shown graphically in Figures 2 and 3 respectively.