FACTORS AFFECTING THE ACCUMULATION AND LOSS OF NITROGEN AND ORGANIC CARBON IN CROPPED SOILS

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It is generally recognized that both the nature and the size of the crops grown affect the gains or losses of nitrogen and organic matter occurring in field soils. More exact information is needed upon the comparative effects of different crops. Further, the attempt should be made to differentiate between the effects of the cultural practices employed in growing a crop and those of the residues left by it.

In the present report these questions are considered in connection with changes that have taken place in the contents of organic carbon and nitrogen in fertility plat soils at the Ohio Experiment Station. Some data showing the effects of manure also will be presented.

For all experiments cited the soil is the Wooster silt loam, a yellowish brown soil derived from non-calcareous glacial sandstone and shale material, naturally acid and only moderately supplied with organic matter and nitrogen.

COMPARISON OF DIFFERENT CROPS

In Table 1 are presented the nitrogen and organic carbon contents for the surface soils of plats in both continuous and rotative cropping. The data are for check plats continuously untreated except for liming as indicated. Analyses of the soils at the beginning of the experiments are available only for the 5-year rotation experiment. Since there is reason for believing that the soils of all the experiments were closely alike at the start, the foregoing analyses will be employed in estimating the changes that have taken place in all experiments.

Greatest losses of both nitrogen and organic carbon are noted with continuous cropping to corn followed in order by continuous wheat, continuous oats, the 5-year rotation, and the 3-year rotation. In order to obtain a better idea of the comparative effects of the individual crops, these data have been subjected to mathematical analysis involving certain assumptions as discussed below.

The average effect of a given crop in a single year is assumed to be proportional to the soil's content of organic carbon or nitrogen at the beginning of the year. This is based upon the following two assump-