PHYSICAL and chemical studies dealing with the effects of cultivation on soils have been conducted in numerous states. Workers in the following states have made one or more outstanding contributions: Illinois, Kansas, Kentucky, Michigan, Minnesota, New York, New Hampshire, Missouri, Ohio, Oregon, Oklahoma, Pennsylvania, South Dakota, Virginia, Washington, and Wisconsin. The effects of tillage on many of the more or less dynamic physical and chemical properties of soils have been reported as a result of these investigations. Each report deals with one or more of the following: Water-stable aggregates; infiltration rates; dispersion ratio; erosion ratio; volume weight; porosity; organic matter; humus; total nitrogen; organic carbon; C:N ratio; total sulfur; base exchange capacity; percentage base saturation; exchangeable calcium, magnesium, and phosphorus; moisture equivalent; wilting percentage; and water-holding capacity.

Almost without exception a pronounced effect has been recorded for all factors studied. To the writers' knowledge studies of the effect of cultivation on these or related factors have never been made on Piedmont soils.

Throughout the history of agriculture in this country, the South has consistently had a greater proportion of its tillable land continuously devoted to cultivated crops than has any other section. Fortunately, the physical characteristics and topographic features of the Coastal Plain soils are such that excessive erosion has not resulted. In the Piedmont, however, these conditions are of such nature that soil losses have been excessive, in fact, greater than in any other agricultural section. It is obvious that this erosion has added to the serious effects which cultivation alone would have produced on the hundreds of thousands of acres of land in continuous cultivation.

Any changes in the fundamental qualities of Piedmont soils, whether due to erosion or to cultivation, are of agricultural importance because of their effect on fertility. For this reason it was deemed desirable to study the changes which cultivation has brought about on certain soil properties associated with fertility. The present report deals with the investigations carried out on Piedmont soils.

A detailed review of literature is dispensed with at this point, since Whiteside and Smith (9), Shaulis and Merkle (8), and Puhr and O'Brien (7) have published more or less complete reviews of available information, and none of the past studies have been concerned with the effects of cultivation under climatic and soils conditions similar to those of the Piedmont.

EXPERIMENTAL PROCEDURE

SITES SAMPLED

Nineteen separate sites were sampled, representing 15 counties. The location of the sites sampled is shown in Fig. I. Each site consisted of two units, one a continuously cultivated field and the other an adjacent wooded area. Sites were selected so that the two units occurred on the same series and type, as well as on approximately the same slope. In no case was the distance between the points of sampling of the two units greater than 250 feet. In 16 of these instances it consisted of second growth timber, and in one instance a stand of oaks on an area which had been cultivated 75 years previously.

In order that the direct effects of cultivation rather than those associated directly with excessive erosion merely tend to exaggerate the conditions studied, it was necessary that sites be located on level to moderately sloping land where a minimum of soil loss had occurred. It is evident that this study does not fully represent the average cultivated field in the Piedmont. It was thought desirable to determine the effects of cultivation on a stand of second growth timber, and in one instance a stand of oaks on an area which had been cultivated for 75 years previously.

The predominant soils of the Piedmont vary from a sandy loam texture, when noneroded. The cultivated unit possessed an almost complete A horizon, having been eroded to the extent that it was a sandy loam texture. From a textural standpoint, the cultivated field was less consolidated than the wooded unit, and therefore was more susceptible to erosion.