EFFECTS OF CROPPING ON THE PHYSICAL CONDITION OF THE SOIL WITH DATA ON YIELDS

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The purpose usually stated for changing crops on the land, or for changing soil treatments, are, first, for reasons relating to the plant food constituents of the soil; second, for reasons relating to the control or eradication of insect, fungous, and weed pests and other deterrents; and third, for reasons relating to the economic management of the land.

These purposes are well expressed, but another set of reasons might well be added, namely, those relating to the physical condition of the soil. That the physical condition of the soil has important influences on the productivity of the land is a well recognized fact, and sometimes the so-called “fertility” of the land may be more largely a function of the physical condition than of the chemical composition of the soil.

These influences are generally due to moisture and air relationships; and these in turn modify temperature, biological, and chemical conditions existing in the soil. As a general rule, the characteristic of the soil referred to under the term “physical condition” is its structure. Within the same soil type variations in structure, at least so far as tillage is concerned, are due largely to cohesion of the soil particles, their plasticity, and to friction on the contact surfaces of the implement used. These characteristics, in turn, are related mainly to organic matter, colloid, and moisture contents.

The influence of crops and crop culture on the physical condition of the soil, and especially on its structure, is a subject full of complexes and interrelationships. The decaying roots and the consequent soil color; the presence of added or residual organic matter; the time, frequency, and type or process of stirring the soil; and the nature of the crop grown, all have a bearing on the interesting and important subject of structure or tilth of the soil. The physical condition of the soil may be measured by the draft of the plow, harrow, or other implement by which the soil is stirred, and this figure may then be correlated with the several factors enumerated above.

A considerable amount of work has been done on the factors that influence the draft of the plow and other cultivating implements

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