Residual Effect of Some Perennial Grasses on the Structure of an Eastern Nebraska Fine-Textured Soil

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In recent years considerable work has been reported concerning the effects of various perennial sod crops, particularly grasses, upon the chemical and physical properties of soils (2, 9). Comparisons have been made of the relative effectiveness of grasses as compared to various other crops in promoting stability of soil granules for soils of the central Great Plains (1, 7). Recently the authors (5) investigated the relative effectiveness of a number of grasses in stabilizing soil aggregates. This work was concerned only with the aggregate stability imparted to the soil at the time the sod was broken out for crop use. Considerable differences in the ability of various grasses to provide stability to the soil granules were noted. Other recent reports (1, 4) have been published regarding the relation between the time the grass cover has been maintained and the stability of the soil granules. The material available from the previous study by the authors (5) provided an opportunity to investigate the effectiveness of the stability imparted to the soil aggregates by the various grasses with the passage of time.

It is the purpose of this paper to present data obtained relative to the effectiveness of some perennial grasses in influencing the structure of an eastern Nebraska fine-textured soil two years after the grass sods had been broken for crop use.

Experimental Procedure

The design of the original grass experiment, in which forage yields and quality of grasses were compared, is fully described in a previous report on the effects of mowing frequency on the yields and protein content of 11 different grasses (8). The experiment was conducted on the Agronomy Farm near Lincoln, Nebr. This area has been mapped recently as Sharpsburg silty clay loam, rolling phase. However, the soil on these experimental plots is more characteristic of a Butler silty clay loam. A summary of the analytical methods and soil sampling techniques used in 1944 on eight replications of 13 different grass covers is found in the previous report by the authors (5).

In 1946 samples were taken with sampling tubes to a depth of 4 inches from the same plots as in the previous study after two years of cropping to small grain. Five cores were taken per plot, the cores composited, and the sample was put on a screen while moist. The samples were air-dried and assumed that the aggregate stability of the samplies inches would be comparable to that of the same study taken at 1 to 3 inches. The validity of this has been borne out by previous work if both samples plow depth.

The percentage of aggregates greater than 0.25 mm measured by a wet sieving procedure (6) which inches in diameter with 0.25-mm openings. A consisting of 7.5 grams of air-dry soil was used. The being wetted for 1 to 2 minutes, were subjected per minute with a stroke of 1½ inches for a per

Experimental Results

The influence of the various perennial grasses on the percentage of water-stable aggregates in samples less than 0.25 mm is presented in Fig. 1. Both the 1944 sampling of 1 to 3 inches and the 1944 sampling of 0 to 4 inches are included.

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