Wheat Production in the Semiarid Pacific Northwest as Influenced by Methods of Handling Sweet Clover as a Green Manure Crop

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Sweet clover or alfalfa in combination with grasses has been recommended for many years as the foundation of soil conserving rotation systems in the semiarid areas of the Pacific Northwest where dry farming is practiced. A mixture of sweet clover and grass is primarily used because it is a short rotation and easily used in a cash crop system of farming.

Studies (1, 3) conducted in the semiarid areas show that continuous farming under the straight grain fallow system results in a loss of soil organic matter and nitrogen. Erosion from both wind and water has been observed to increase with the decrease in soil organic matter. There has also been a drop in the protein content of wheat which is associated with decrease in soil nitrogen and organic matter.

Studies (2, 6, 7) have shown that organic matter can be maintained in the soil through the use of crop residues in a rotation system including adequate legumes.

Various studies (4, 8) have shown that this mulch will protect the land from both wind and water erosion. Some studies have been conducted in the use of the residues from the surface mulch for protection from erosion. The use of mulch, however, raises several questions on methods of handling, the effect on the soil, and yield of the following wheat crop. The purpose of this paper is to report the influence on wheat production of various treatments of the sweet clover crop as a mulch as compared to turning it under.

EXPERIMENTAL PROCEDURE

These trials were conducted at the Tetonia Branch of the Idaho Agricultural Experiment Station. The station is at an elevation of 6,200 feet, with an average rainfall of 13.0 inches. The soil has tentatively been classified as Ritzville silt loam. The cropping system followed is mainly alternate wheat-fallow. Several trials were incorporated into one experiment and were set up on a four way split-plot basis with three replications. The following terms are used throughout the paper and will serve to explain the experiment as conducted.

Succession—Two complete sets of plots were started, one in 1943 and one in 1944. Each set of plots represents a succession.