THE EFFECT OF SWEET CLOVER GREEN MANURE ON CROP YIELDS ON THE HEAVY SOILS IN MICHIGAN

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THE value of green manure in improving crop yields has been generally recognized. Under Michigan conditions sweet clover has proved to be a crop especially adapted to the heavy soils of the state. The heavy soils, for the most part, are relatively high in organic matter, ranging from 2.5% to 10.0%. These soils, as a rule, will support both a small grain crop and an inter-seeding of sweet clover, thus eliminating the necessity of the loss in crop production that occurs in establishing a stand of sweet clover on a soil not capable of supporting both crops simultaneously. The reaction and calcium content of these soils are usually high enough to be favorable for sweet clover without an application of lime.

The data herein reported refer specifically to the effect of sweet clover seeded with a small grain crop, allowed to grow during that season, and plowed down the following spring for a cultivated crop. These cultivated crops were corn, white beans, and sugar beets. In addition, data are included on the effect of sweet clover in a rotation on a wheat crop following a crop of beans and a mixed crop of oats and barley following a crop of sugar beets.

The change occurring in the total amount of dry matter, the dry weights of roots and tops, and the amount of nitrogen that is contained in a crop of sweet clover during the early spring growth is reported.

REVIEW OF LITERATURE

The literature on the subject of sweet clover as a green manure is voluminous and only a small number of the available publications on the subject will be noted.

According to Pieters (3), the use of green manure crops was recorded in the early historical agricultural records and the practice was followed by the Chinese approximately three thousand years ago.

The classical treatise by Willard (5) on the growth habit of sweet clover gives a detailed discussion of many phases of its development. In one phase of his work he points out that during the early growth of sweet clover the top growth develops, in part, at the expense of the root reserve material thus causing a decrease in root material.

Obenshain and Gish (2) report an average increase in an 8-year period of 7.26 bushels of corn from sweet clover green manure. They suggest that some of the benefits derived from the use of green manure are due to an improvement in the physical condition of the soil.

Millar, Cook, and Davis (1) report an increase in the yield of white pea beans due to sweet clover turnings for green manure.

Sullivan, et al., (4) found that legume crops in rotation tended to increase the vitreousness of the kernel amount and quality of the kernel, as well as the amount of wheat.

CHANGES OCCURRING IN THE TOTAL MATTER, DRY WEIGHT OF TOPS, DRY WEIGHT OF ROOTS, AND POUNDS NITROGEN DURING THE EARLY GROWTH OF SWEET CLOVER

In the spring of 1942 roots and tops of sweet clover grown on a Brookston clay loam were harvested on three different dates, viz., April 20, April 29, and May 5. The top growth on the above dates was approximately 2 inches on April 20 (Fig. 1), 5 inches on April 29 (Fig. 2), and 9 inches on May 5 (Fig. 3). The growth was very rapid and the field was plowed early in May. If sweet clover is allowed to get high, 9 to 10 inches and if the weather conditions prevail during the month of May, it is difficult to prepare a good seedbed. In the following spring a crop may suffer from lack of moisture. Under ordinary conditions the seeding date later than May 15 is not recommended for field beans, which are usually seeded on the first week in June.