THE OCCURRENCE AND CORRECTION OF UNPRODUCTIVE ALKALINE ORGANIC SOILS

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The organic soils of Michigan, with an estimated total area of more than 4,000,000 acres, range in reaction from those intensely acid to those which are decidedly alkaline. It is probable that from 10 to 15% of the total acreage can be placed in this latter group. A large proportion of these alkaline soils are unproductive, as measured by the yields of a considerable number of crops. Most important of these are barley, beans, celery, corn, lettuce, oats, onions, peas, potatoes, radishes, soybeans, spinach, Sudan grass, and table beets.

Frequently, the cause of the alkalinity which has produced this unproductive condition can be found in the burning over of a muck, at some time in the past, the original soil of which was already well supplied with lime. A second important cause of the alkalinity lies in the presence of marl within a couple feet of the muck surface. A third is to be found in the occurrence of springs underneath the muck, the waters of which come to the surface and evaporate, leaving their alkaline salts. A fourth arises from the application of lime on organic soils already well supplied with lime. A fifth and less important cause of this alkaline condition is to be found in the presence of large amounts of certain basic mineral oxides, even when the lime content is not high.

In a report of the occurrence and control of “grey speck” of oats in the Netherlands, Sjollem and Hudvig apparently were the first to recognize the natural unproductiveness of alkaline organic soil. The presence of this soil in Germany was reported first by Fleischer in 1913. In America, Alway reported in 1920 the occurrence of alkaline organic soils in Minnesota. In all of these cases, however, the alkalinity was evidently due to over-liming. Alway mentioned burning as one of the causes. Allison again cited the effects of alkaline organic soil in Florida in 1929 and mentioned burning as one of the causes. Harmer warned against over-liming and in 1932, Alway mentioned that flax did not do well, however, the alkalinity was evidently due to over-liming. Alway mentioned that flax did not do well, however, the alkalinity was evidently due to over-liming. Alway mentioned that flax did not do well, however, the alkalinity was evidently due to over-liming.

The writer observed a depression in clover yields from over-liming in house experiments in Minnesota in 1914 and a very marked depression in growth of onions and burning of the surface foot of a high-lime muck in Wisconsin in 1920. Again in 1921 had shown no depressed yield whatever. In 1922, a crop of corn in 1920, although sugar beets on the same field in 1921 had shown no depression in the following years, numerous instances in which spots in Michigan onion fields on high-lime muck were observed to produce plants with curled, yellow tops and delayed maturity, those spots showing in almost every case an alkaline or near-alkaline reaction. Similar occasional celery fields, generally of cracked-stem disease in addition.

EXPERIMENTAL

Investigations regarding the correction of alkaline organic soil have been made in Michigan for more than 20 years and permit the presentation of all available data. A few instances are offered to show the results of the correction under some of the conditions described.

One of the first studies made was that of Allison, who was largely responsible for the soil analyses. Allison (1) called attention to alkaline organic soil in Germany in 1913. In America, Alway (2) reported in 1920 the occurrence of alkaline organic soils in Minnesota. In all of these cases, however, the alkalinity was evidently due to over-liming. Alway mentioned that flax did not do well, however, the alkalinity was evidently due to over-liming. Alway mentioned that flax did not do well, however, the alkalinity was evidently due to over-liming.