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## The Effect of Lime and Phosphate on Nitrification in an Acid Soil

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of the entire vascular cylinder. The strands of libriform fibers in the cortex are shortened in the same manner.

There is evidence, however, that some of the parenchyma tissues, as those of the cortex, are forced to reduce their vertical dimension on account of the compression induced by the lengthwise shortening of the mechanical tissues. The crumpling sometimes noticeable on the surface of the roots and crowns of the biennial sweet clovers affords evidence of this fact.

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#### GERMINATION OF CORN IN THE FIELD AS AFFECTED BY SOIL AND AIR TEMPERATURE

J. M. AIKMAN

The corn was planted at weekly intervals from April 15 to May 27. A continuous record of soil and air temperature was obtained from a soil-air thermograph set up in the plot. Tabulations were made of maxima, minima and average weekly soil and air temperatures for the germination period of each planting. The length of the period necessary for 85 per cent emergence for the seven plantings was 21, 22, 18, 18, 16, 15 and 11 days respectively. Length of germination period shows a higher correlation with average soil temperature than with air temperature. Correlation with the total heat units above a plant zero of 50° F. is highest.

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#### THE EFFECT OF LIME AND PHOSPHATE ON NITRIFICATION IN AN ACID SOIL

HAROLD L. DEAN AND F. B. SMITH

The nitrate content in all soils is maintained through the action of microorganisms upon ammonia. This process of nitrate production is called nitrification. It is interesting to note the effect that lime and rock phosphate has upon the nitrate producing power in an acid soil.

Tama silt loam, having a pH of 5.3 and lime requirement of 3 tons per acre, was used for this experiment. Calcium and dolomitic

limestones were applied at the rate of 3 tons per acre. Rock phosphate alone and in combination was applied at the rate of 250 lbs. per acre. Samples of the treated soils were taken after 4, 10, 16, 22, 28 weeks to determine nitrate accumulation and nitrification.

The addition of limestone increased the nitrate content of the soil, although it was not noticeable until 4 months after the beginning of the experiment. Limestone applied with rock phosphate showed a similar increase, being just slightly higher than the limestone alone. Rock phosphate alone did not affect nitrification to any appreciable extent.

Throughout the experiment, calcium limestone gave slightly higher results than dolomitic limestone. This is believed to be due to the fact that the calcium limestone used was more finely divided than the dolomitic limestone.

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### SOME EFFECTS OF FERTILIZATION ON NITRIFICATION IN HIGH-LIME SOILS

F. B. SMITH AND HARTZELL C. DEAN

Applications of potassium chloride at the rate of 100, 200 and 500 pounds per acre were made on two soils containing a high calcium content. Oat straw at the rate of 2 tons of dry matter per acre was applied alone and in combination with potassium chloride. Sweet clover at the rate of 2 tons of dry matter per acre was applied alone and in combination with potassium chloride. Samples of the soils were taken 4 weeks after treatment in the greenhouse and again after 5 months for nitrification determinations.

The soils under all treatments as well as the untreated checks contained a high content of nitrate-nitrogen. Nitrification tests showed that several times as much nitrate nitrogen was formed as was added in the form of ammonium sulfate, indicating a complete nitrification of the ammonium sulfate added and oxidation of organic matter or nitrogen fixation. Nitrification was stimulated at first by additions of potassium chloride but was apparently depressed sometime after 4 weeks. Oat straw depressed nitrification at first but the effects had about disappeared after 5 months.

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