NITROGENOUS FERTILIZERS AND SOIL ACIDITY:

I. EFFECT OF VARIOUS NITROGENOUS FERTILIZERS ON SOIL REACTION

W. H. Pierré

The rapid development in the manufacture of new nitrogenous fertilizers during the last few years has created considerable interest in their value. One of the important criteria in evaluating different nitrogenous fertilizers is their effect on soil reaction. It has long been known that the use of ammonium sulfate causes an increase in the acidity of the soil and that nitrate of soda, the other most commonly used inorganic source of nitrogen, has the opposite effect on soil reaction. Very little is known, however, regarding the effects of the various new nitrogenous fertilizers on soil reaction.

Among the most common of the new synthetic fertilizers are Leunasalpeter, urea, ammonium nitrate, and ammonium phosphate. Calcium nitrate and calcium cyanamid are two other synthetic fertilizers whose effects on soil acidity are not definitely known. Urea and ammonium nitrate have been reported by various investigators (2, 15) as having no effect on the reaction of the soil. Brioux (5), on the other hand, has given experimental data indicating that the use of urea results in increased soil acidity. From a theoretical consideration it would seem that urea, ammonium nitrate, Leunasalpeter, ammonium chloride, and ammonium sulfate should all result in increasing the acidity of the soil, whereas calcium cyanamid, calcium nitrate, and sodium nitrate should have the opposite effect.

In view of the importance of this problem from the standpoint of practical agriculture, the present investigation was started.

The objects of the investigation were as follows:

1. To determine the effect of using these various nitrogenous fertilizers on the H-ion concentration of soils.
2. To determine the effect of using these fertilizers on the increase or decrease in the amount of hydrogen in the exchange complex of the soil.

1Paper presented at the meeting of the Southern Section of the Society held in Auburn, Alabama, Aug. 24-25, 1927. Contribution from the Department of Agronomy, Alabama Agricultural Experiment Station, Auburn, Ala. Published with the approval of the Director. Received for publication Dec. 17, 1927.

2Associate Soil Chemist. The writer wishes to express his appreciation to Director M. J. Funchess and Dr. F. W. Parker for suggesting this problem and for the very helpful suggestions and criticisms rendered during the progress of the investigation.

3Reference by number is to "Literature Cited," p. 268.