A CHEMICAL STUDY OF A SOIL UNDER LONG-
CONTINUED FIELD EXPERIMENTS

H. J. SNIDER

This work included a laboratory study of both soil and crop samples obtained from two series of fertility plats on the Odin experiment field. This field was established in 1902, and was one of the oldest of the outlying soil fields of the Illinois Experiment Station. The series of plats studied were started in 1904 and were under a system of soil treatment and crop rotation until after the soil samples were collected in the fall of 1931, thus covering a period of 27 years of experimental work.

OBJECT OF STUDY

The plan of soil treatment and crop yield data suggested the following lines of investigation:

1. The accumulation of the applied phosphorus and the influence of limestone upon the native and applied phosphorus.

2. The penetration of the applied phosphorus into the subsurface soil.

3. The accumulation and availability of potash salts when used with limestone and phosphate treatments.

4. The effect of different amounts of limestone upon soil reaction and replaceable calcium and magnesium.

5. The effect of long-continued soil treatment and crop rotation upon the nitrogen and organic-matter content of the soil.

6. A study of the assimilation of phosphorus and potassium by crops.

DESCRIPTION OF THE FIELD

This experimental field was located on Cisne silt loam, a soil low in fertility, poorly drained and having a very compact subsoil. A general description of the field and plan of plat layout has been presented by Bauer, et al. In 1904, hydrated lime at the rate of 1 1/2 tons an acre was put on series 800; and in 1908, 1913, and 1919, limestone was applied which brought the total applications up to 8 tons an acre. Series 600 was unlimed up to 1922, when 1 ton an acre of limestone was applied and an additional 2 tons were put on in 1927 making a total of 3 tons an acre.

From 1904 to 1919, inclusive, phosphatic fertilizers were broadcast in relatively small applications at more or less regular intervals until the total amounts an acre were as follows: Superphosphate, 7,000 pounds; rock phosphate, 14,000 pounds; and basic slag, 5,250 pounds. No analytical data were recorded showing the exact phosphorus content of these materials. It is assumed that the content was about as follows: Superphosphate, 16% P₂O₅; rock phosphate, 12.5% phosphorus; and basic slag, about 9% phosphorus.

1 Contribution from the Department of Agronomy, University of Illinois, Urbana, Ill. Published with the approval of the Director. Received for publication August 2, 1934.

2 Assistant Chief, Soil Experiment Fields.

3 Reference by number is to "Literature Cited," p. 953.