INFLUENCE OF CROPPING, MANURE, AND MANURE PLUS
LIME ON EXCHANGE CAPACITY, EXCHANGEABLE
CALCIUM, pH, OXIDIZABLE MATERIAL, AND
NITROGEN OF A FINE-TEXTURED SOIL
IN EASTERN NEBRASKA

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EFFECTS of cropping and fertilization on the chemical properties
of soils have been the subject of extensive research. Whiteside
and Smith (8) have recently reviewed the literature concerning soil
changes associated with cropping in humid areas of the United States.
Prince, et al. (5), who worked with soil materials in cylinders, have
reported the changes in several properties of a New Jersey soil during
40 years of nitrogenous fertilization. Metzger (3) has presented data
concerning the effect of fertilizers, manure, and lime on several
properties of a Kansas soil cropped to alfalfa. Merkle (2) has referred
to numerous publications dealing with the after effects of fertilizers
in his report of base exchange studies on the Pennsylvania Jordan
field plots.

It is the purpose of this paper to report the effect of cropping, of
applications of manure, and of applications of manure plus lime on
exchange capacity, exchangeable calcium, pH, oxidizable material,
and nitrogen of the soil at the fertility plots near Lincoln, Nebr. The
soil of these plots is tentatively mapped as Marshall silty clay loam,
but it has a heavier and more compact subsoil than is typical for
that soil type. For the 71-year period ending with 1941, the mean
annual precipitation at Lincoln was 26.8 inches. During the 16-year
rotation period, 1921 to 1936, the mean annual precipitation was 24.3
inches, with annual amounts varying from 14.1 to 34.3 inches. About
three-fourths of the precipitation occurs in the growing season, April
to September, inclusive.

FERTILITY PLOTS

The fertility plots, established in 1921, were designed for the purpose of studying
the effect of manure and commercial fertilizers on the yields of corn, oats,
wheat, and alfalfa during a 16-year rotation period. The plots were 28 feet wide,
0.1 acre in size, and were separated by an untreated but cropped alley, 7 feet
wide. They were arranged in four parallel tiers, 46 plots each, every third plot
being a check plot. The same order of treatment was followed in each tier, so
that the manured and check plots being considered in this work made up a section
of nine adjacent plots at the end of each of the four tiers. In the rotation,

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Instructor, and Associate Professor in Agronomy, respectively.
3Figures in parenthesis refer to "Literature Cited", p. 113.
4These plots were established by T. A. Kiesselbach, J. C. Russel, and Arthur
Anderson.