DECLINING NITRATE LEVELS IN PUTNAM SILT LOAM

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A 13-year study of the nitrate content of the surface soil of Putnam silt loam under cultivation reveals a gradual decline in the levels of the supply of this plant nutrient. The soil in question is a rolling phase of Putnam silt loam in a transition area approaching Lindley loam. It had been in grass for many years as pasture and as an undisturbed part of the station field previous to its use in this project. It was plowed as probably a native sod before this study was undertaken.

PLAN OF STUDY

During 13 years, 1920–32, inclusive, bi-weekly nitrate determinations (except when the soil was frozen) were made on the surface soil of a series of small plats. Some were continuously in corn, some in wheat, and some in fallow. Different tillage and fertilizer practices were combined with these crop treatments. During the first 6 years the wheat plats were plowed at different dates. The corn plats were given different tillage, while some of the fallow plats were given straw mulches. No plant nutrient additions were made. During the last 7 years all the plats were given standard tillage treatments supplemented with the more common fertilizer applications.

As an illustration of the general behavior of these nitrate levels, three plats have been selected as representative. One of these was in corn continuously for 13 years with the normal tillage treatment of spring plowing and surface cultivation, but given a spring treatment of ammonium sulfate (25 lbs. per acre) broadcast during the last 7 years. Another plat was in wheat continuously during the same time with regular plowing on August 15, followed by the customary treatment of seedbed preparation. During the last 7 years this was fertilized with the equivalent of 200 pounds of 2–12–0 at seeding. The third plat was fallow with a 6-ton straw mulch applied in late April following the spring plowing and after the removal of the straw in time to permit drying of the soil to a tillable condition.

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