NITROGEN BALANCE IN A FOUR-YEAR GRAIN ROTATION, 1881 TO 1921

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Since 1881, nitrate of soda applied biennially to corn and wheat has been compared with various other manurial treatments in the old field plat experiments of the Pennsylvania Agricultural Experiment Station. In addition to the nitrate treatment these plats receive also a uniform dressing of superphosphate and muriate of potash. A study of these plat soils compared with those that receive similar applications of phosphorus and potassium fertilizers affords an opportunity for determining the ultimate fate of the applied nitrogen and its residual effect upon the soil in addition to its economic value in the production of the several crops included in the rotation.

PENNSYLVANIA FIELD PLAT EXPERIMENTS

The Pennsylvania soil fertility experiments of the old fertilizer series include 144 one-eighth acre plats arranged in four tiers of 36 plats each. The 23 manurial treatments, with the exception of burnt lime, are applied to corn and wheat in a 4-year rotation of corn, oats, wheat, and hay (mixed clover and timothy). The burnt lime treatment is applied once each rotation to the corn ground. During the first 10 rotations (1881 to 1921) no lime was applied except to plats in which it is included in the scheme of treatments. In 1922 and 1923, all plats of tiers two and four, respectively, with the exception of two PK-treated plats and those previously limed, received a dressing of pulverized limestone. With the exception of the plats which receive farm manure, the only source of organic matter has been the roots and stubbles of the harvested crops. The experiments are located on a residual limestone soil of the Hagerstown series. The soil at the beginning of the experiments was very productive as shown by the early yields of the untreated plats. Prior to the establishment of the plats the land was used for general farming and from 1867 to 1881 various miscellaneous experiments were conducted, including variety tests and tillage experiments.

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