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Department of Agronomy

Soil Science News & Views



Vol.2, No.5, May 1981

INFLUENCE OF SOIL TYPE ON NITROGEN FERTILIZATION OF CORN

G. W. Thomas

In Kentucky, response of corn to nitrogen fertilizer is influenced strongly by soil characteristics. These soil properties are of both a permanent and temporary nature.

The permanent soil property that influences nitrogen response most is drainage. When drainage is limited, response to nitrogen will be high for two reasons: First, nitrogen is lost through denitrification and leaching and second, the yield potential of poorly-drained soils is higher due to the higher water content during the growing season. Well-drained soils, on the other hand, show smaller responses to nitrogen because more of the mineralized nitrogen is saved for the crop, but also because there is less potential for yield. The data in Figure 1 are taken from two 10-year experiments. One soil is a Melvin (poorly drained) which grows almost no corn with no nitrogen. The other soil is a Maury (well-drained) where the check plot yields 75% of the nitrogen plot. Notice, however, that the yields on the Melvin, where adequate nitrogen was applied, are much better than on the Maury.

A temporary soil factor that influences response to nitrogen is the amount of nitrogen mineralized from organic matter. In general, corn planted behind old sod crops such as fescue and clover requires only low amounts of nitrogen fertilizer, but corn after corn requires more fertilizer. This requirement is also related to soil organic matter content, but only slightly. Therefore, it is possible to predict that a soil with 4% organic matter will show less response to fertilizer nitrogen than one with 2% organic matter. It would not be possible to predict the response between soils with 2.5 and 3.0% organic matter, however.

In general, nitrogen recommendations for corn in Kentucky are based on the soil properties discussed above. A major distinction is made between well-drained, moderately-well drained and poorly drained soils, with nitrogen rates nearly doubling between well-drained and poorly drained soils. A further distinction is made between soils formerly in sods for more than 5 years, less than 5 years or following corn. Here again, the recommended rates nearly double going from old sod to corn following

corn. For further details, the reader is referred to AGR 1, the official fertilizer recommendation booklet.

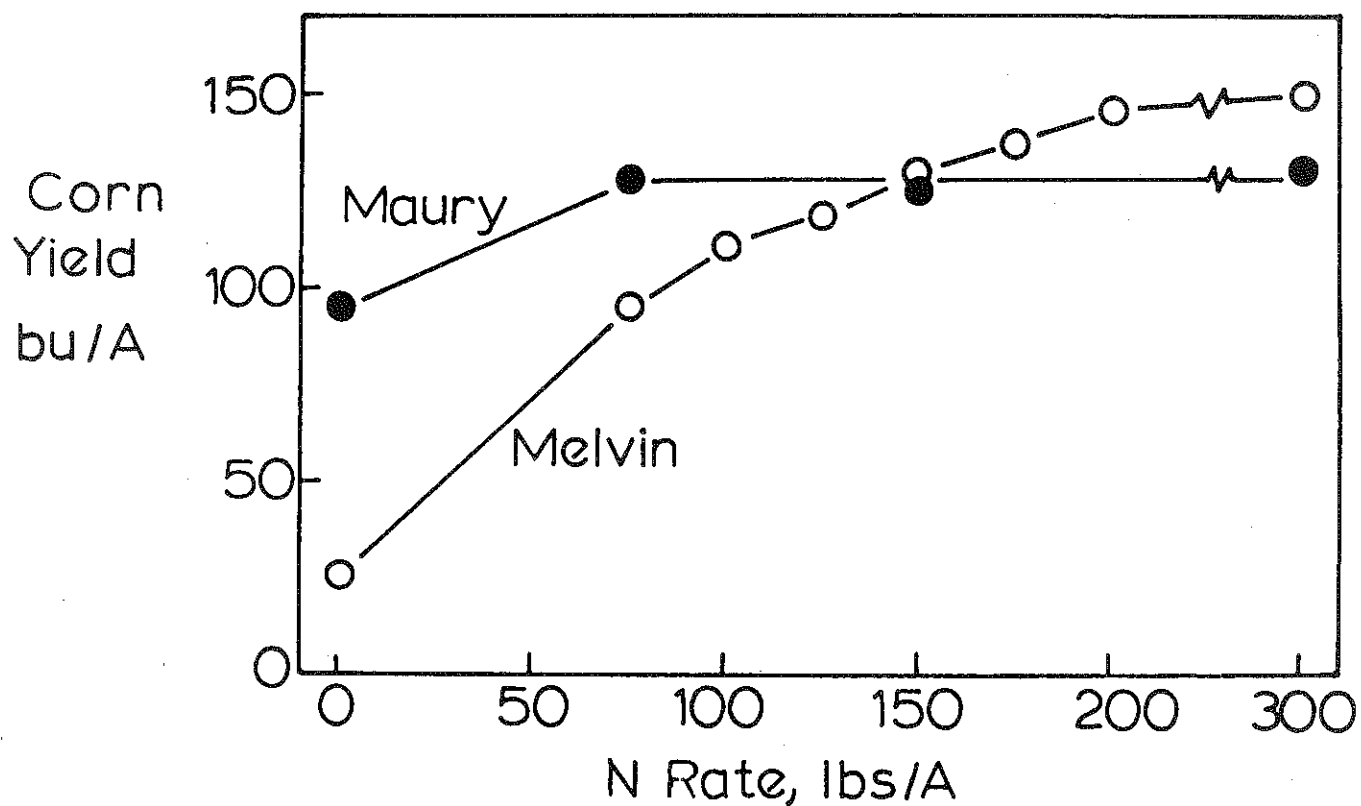


FIGURE 1 10-YEAR CORN YIELDS ON MELVIN AND MAURY SOILS