LEACHING STUDIES WITH VARIOUS SOURCES OF NITROGEN

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Because of the open texture and ready penetration of water into many Florida soils, one of the most difficult problems in their management is the serious losses to which their soluble plant food components are exposed by direct leaching. This is especially true of nitrogen and accounts largely for the constant attention required to maintain in such soils an adequate balance of this element for nonleguminous plants.

If a soluble form of nitrogen could be found, therefore, that is consistently more stable in such soils and not so easily leached, obviously it would find a wide application under Florida conditions. The principal purpose of this paper is to present the results of a study of the stability against leaching of nitrogen in a number of fertilizer materials.

REVIEW OF LITERATURE

The loss of nitrogen from soils through leaching has been reported by many investigators (2, 4, 5, 6, 7, 12, and others). Nitrate nitrogen is the main constituent lost, although other forms may leach to a lesser extent.

In some of these investigations fallow lysimeters have been treated with nitrogenous fertilizers and the leachings studied through definite periods varying from a few months to several years. These studies have shown almost complete recovery of nitrogen from applications of the nitrate form, most of which leached shortly following its application. Urea has been transformed to nitrate and efficiently leached in that form. Sulfate of ammonia has been nitrified to a slightly lesser extent than urea as indicated by a lower leaching of nitrate nitrogen. The insoluble organic fertilizers, on the other hand, have not been recovered very efficiently in the leachates.

Ammonium nitrogen has been reported to wash from light-textured soils when leaching took place shortly after the application of ammonium sulfate. The extent of the leaching has been found to vary directly with the base exchange capacity of the soil.

Parker (8) rated the retention of nitrogen sources by the soil as follows: Sodium nitrate, readily leached; urea, ammonium sulfate, and insoluble organics, leached with difficulty.

A study was undertaken to determine the relative leachability of different forms of nitrogen—nitrate, ammonium, nitrite, and urea—at various intervals following the application of nitrogenous materials to Norfolk sand. The leaching of nitrogen from this soil was further compared with other soils of different colloid content and properties.

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3Figures in parenthesis refer to "Literature Cited", p. 53.