

ABSTRACT

Fixation, release and leaching of potassium and magnesium as well as the interaction between these two elements were studied in the River Estate Sandy Loam under a pangola grass crop.

Potassium fixation and release in the soil were also investigated in the laboratory.

Both fixation and release of potassium occurred under field conditions. Fixation was evident for the two highest levels (120 lbs/acre and 240 lbs/acre respectively) after one month's fertilization. Release occurred during the second month for the two highest levels and was appreciable for all the levels except the highest between the second and fourth month after fertilization. Leaching of potassium was not found to be significant.

A magnesium release phenomenon was indicated: the exchangeable magnesium levels rose appreciably during the third month. Crop uptake did not account for all the magnesium lost; this difference was attributed to fixation since leaching did not occur to any appreciable extent.

The amount of potassium in the soil influenced magnesium uptake by the grass. High potassium levels in the soil resulted in low magnesium uptake and vice-versa.

Studies in the laboratory revealed that moist fixation of potassium is a factor of importance. Equilibrium between all the forms was attained in about one month although fluctuations occurred throughout the six-month period. Varying moisture contents and various potassium salts had little effect on the amount of potassium fixed. But the water-soluble - NH_4OAc extractable potassium ratios were influenced by these variables.

Air-drying increased the amount of potassium fixed: oven-drying resulted in even more fixation. A general relationship

$\log Y = b \log X + c$ where Y = potassium in air-dried state

X = potassium in moist state

b and c = constants depending on the extent of fixation

was found to exist between exchangeable potassium after air-drying and exchangeable potassium in the moist state.

Alternate wetting and drying had little effect on fixation after the first drying regimes.

The presence of NH_4 ions decreased the amount of potassium fixed when 400 p.p.m. potassium was applied to the soil.

A release phenomenon was observed under moist storage. Storage under acidic conditions enhanced a rapid release of fixed potassium.

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April 1963.