THE EFFECT OF SOIL CHARACTERISTICS AND WINTER LEGUMES ON THE LEACHING OF POTASSIUM BELOW THE 8-INCH DEPTH IN SOME ALABAMA SOILS

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A SOLUBLE salt added to the soil will leach into the subsoil as the drainage water moves downward unless something obstructs its passage. In the case of a soluble potassium salt, absorption by plants, soil flora, and exchange material will retard or inhibit the downward passage of the potassium. Truog and Jones reviewed the literature and found that losses of potassium due to leaching varied between practically none and 70 pounds per acre annually, with an average of 10 to 15 pounds per acre per year.

It is the purpose of this paper to report the extent to which potassium has leached below a depth of 8 inches in 8 years when it was applied in varying amounts to different soils and under different cropping systems on fertility plots located on Alabama substations and experiment fields.

METHOD OF INVESTIGATION

Assuming that the greater portion of the potassium that leached below the 8-inch depth would be caught by the exchange material in the 8- to 24-inch depth, a study was made of the distribution of potassium in the soil profile to a depth of 24 inches before and after 8 years of cropping and fertilizing.

A total of 210 plots on eight different soil types were sampled at the 0- to 8-, 8- to 16-, and 16- to 24-inch depths in most cases. Each plot consisted of about 1/40 acre. In sampling a plot, soil was taken from 12 locations to form a composite sample. These samples were then analyzed for soluble and replaceable potash by leaching with ammonium acetate and precipitating the potassium as potassium sodium cobaltinitrite.

EFFECT OF SOIL TEXTURE AND AMOUNT OF POTASSIUM APPLIED PER ACRE ON AMOUNT OF POTASSIUM LEACHED BELOW THE 8-INCH DEPTH

The rates of potash tiers were sampled for this study. These tiers are located on three types of soil as follows: (1) Norfolk fine sandy loam having a friable sandy clay loam subsoil, (2) Hartsells very fine sandy loam having a friable sandy clay loam subsoil, and (3) Decatur clay having a compact but friable clay subsoil. These tiers were cropped continuously to cotton without summer or winter legumes. The amounts and kinds of fertilizer applied annually to the plots were 36 pounds of nitrogen as sodium nitrate, 60 pounds of P₂O₅ as superphosphate, and 0 to 80 pounds of potassium as the muriate.

From the results of the analyses given in Table 1 it is apparent that the nature of the soil has a definite influence on the amount of

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