

Potassium and magnesium retention and losses, as affected by soil and other site factors

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Abstract

Seven long-term nitrogen–phosphorus–potassium–magnesium (NPKMg) fertiliser trials in different Sumatran sites showed different responses of oil palm (*Elaeis guineensis* Jacq.) to fertilisers. Identification of important site factors and quantification of their contribution to the response variation was studied. The information is essential to improve the current fertiliser recommendation system used for commercial fields with similar characteristics. Soil type, mineralogy, topography and rainfall were possible factors responsible for the variation. Retention of applied K and Mg in the soil in the fertiliser trials was measured. Losses in run-off and leaching were studied in additional trials at sites with different rainfall and slopes, and a pot trial. In the long-term fertiliser trials, the soils retained 9–41% of the applied K and 73–102% of the applied Mg. Nutrient loss was more affected by rainfall than soil type. The site at P. Rambong, with twice the rainfall of Bah Lias, had six and eight times greater loads of leaching and run-off, respectively. At the flat sites, losses of K and Mg in surface run-off were 1% and 2% of that applied, respectively, at Bah Lias, and 18% and 10%, respectively, at P. Rambong. Losses of K and Mg in deep drainage were 2% and 5%, respectively, at Bah Lias, and 15% and 23%, respectively, at P. Rambong. At the higher rainfall site, losses of K and Mg in surface run-off were 28% and 13%, respectively. It may be possible to reduce losses by changing fertiliser application practices and by implementing soil and water conservation measures.

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