

Depletion Behavior of Potassium by Continuous Cropping Using Rice as a Test Crop

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Abstract : Potassium (K) is crucial for healthy soil and plant growth. However, K fertilization is either disregarded or poorly underutilized in Bangladesh agriculture, despite the great demand for crops. This could eventually result in a significant depletion of the soil's potassium reserves, irreversible alteration of the minerals that contain potassium, and detrimental effects on crop productivity. Soil K mining in Bangladesh is a worrying problem, and we need to evaluate it thoroughly and find remedies. A pot culture experiment was conducted in the greenhouse of Bangladesh Institute of Nuclear Agriculture (BINA) using eleven soil series of Bangladesh in order to see the depletion behaviour of potassium (K) by continuous cropping using rice (var. Iratom-24) as the test crop. The soil series were Ranishankhail, Kaonia, Sonatala, Silmondi, Gopalpur, Ishurdi, Sara, Kongsha, Nunni, Lauta and Amnura on which four successive rice plants (45 days duration) were raised with (100 ppm K) or without addition of potassium. Nitrogen, phosphorus, sulfur and zinc were applied as basal to all pots. Potassium application resulted in higher dry matter yield, increased K concentration and uptake in all the soils compared with no K treatment; which gradually decreased in the subsequent harvests. Furthermore, plant takes up K not only from exchangeable pool but also from non-exchangeable sites and a minimum replenishment of K from the soil reserve was observed. Continuous cropping has resulted in the depletion of available K of the soil. The result indicated that in order to sustain higher crop yield under intensive cultivation, the addition of potash fertilizer is necessary.

Keywords : potassium, exchangeable pool, depletion behavior., Soil series

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