

Soil test and nitrogen, phosphorus and potassium requirement of maize in south western _Nigeria.

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Abstract:

Soil testing as a fertilizer advisory service to farmers is not common in Nigeria. Method of sample treatment and time of sampling in relation to fertilizer treatment need to be properly established. In order to shorten the time required for analysis, a multi-element extractant has to be developed to cover more than one element at a shaking time.

This study was undertaken to evaluate suitable and rapid methods for a soil testing programme. Simultaneous extraction of P and K at a shaking time of 5 minutes was carried out. Bray II was recommended for the simultaneous extraction of P and K. The field trial was conducted at five locations viz: Ikenne, Akure, Agbede, Ilorin and Ilora.

Available nitrogen, $\text{NO}_3\text{-N}$ was the best index of N availability in soil for short period of four weeks but the poorest under continuous cropping. Soil N critical levels were established with deficient values of 20 ppm $\text{NO}_3\text{-N}$, 0.05% total N and 0.7% carbon while the critical values were 30 ppm $\text{NO}_3\text{-N}$, 0.11% total N and 1.26% carbon. Field correlation and calibration studies was used to establish soil critical P and K. Maize responded to N fertilizer at Ilorin, a savanna zone up to 150 Kg N/ha but lower response to N was observed in forest zone. The critical soil P levels at about 90% relative yield in the field and glasshouse were 9.5 and 12 ppm P while the corresponding deficient levels at 50% relative yield were 6 and 7.5 ppm P respectively. The critical soil K by Bray I, Bray II and $\text{NH}_4\text{ OAC}$ in the field study was higher than greenhouse value with a range of 0.33 - 0.38 me K/100g. The critical N, P and K concentration in maize leaf.

The tissue at four and eight weeks stage were compared. The relation-ship between the tissue content at four weeks and relative yield was better than at eight weeks while the critical values were 3.2%, 0.4% and 3.9% N, P and K at four weeks respectively and 2.80%, 0.29% and 2.50% N, P and K for eight weeks respectively

Keywords: Fertilizer/ Soil test/ Extraction/ tissue testing

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