World Academy of Science, Engineering and Technology
International Journal of Agricultural and Biosystems Engineering
Vol:10, No:05, 2016

Effects of Sole and Integrated Application of Cocoa Pod Ash and Poultry Manure on Soil Properties and Leaf Nutrient Composition and Performance of White Yam

Authors : T. M. Agbede, A. O. Adekiya

Abstract : Field experiments were conducted during 2013, 2014 and 2015 cropping seasons at Rufus Giwa Polytechnic, Owo, Ondo State, southwest Nigeria. The objective of the investigation was to determine the effect of Cocoa Pod Ash (CPA) and Poultry Manure (PM) applied solely and their combined form, as sources of fertilizers on soil properties, leaf nutrient composition, growth and yield of yam. Three soil amendments: CPA, PM (sole forms), CPA and PM (mixture), were applied at 20 t ha⁻¹ with an inorganic fertilizer (NPK 15-15-15) at 400 kg ha⁻¹as a reference and a natural soil fertility, NSF (control). The five treatments were arranged in a randomized complete block design with three replications. The test soil was slightly acidic, low in organic carbon (OC), N, P, K, Ca and Mg. Results showed that soil amendments significantly increased (p = 0.05) tuber weights and growth of yam, soil and leaf N, P, K, Ca and Mg, soil pH and OC concentrations compared with the NSF (control). The mixture of CPA+PM treatment increased tuber weights of yam by 36%, compared with inorganic fertilizer (NPK) and 19%, compared with PM alone. Sole PM increased tuber weight of yam by 15%, compared with NPK. Sole or mixed forms of soil amendments showed remarkable improvement in soil physical properties, nutrient availability, compared with NPK and the NSF (control). Integrated application of CPA at 10 t ha⁻¹ + PM at 10 t ha⁻¹ was the most effective treatment in improving soil physical properties, increasing nutrient availability and yam performance than sole application of any of the fertilizer materials.

Keywords : cocoa pod ash, leaf nutrient composition, poultry manure, soil properties, yam
Conference Title : ICAFBBE 2016 : International Conference on Agricultural Sciences, Food, Beverage and Bioprocess Engineering
Conference Location : Amsterdam, Netherlands
Conference Dates : May 12-13, 2016