

*Expl Agric.* (2016), volume 52 (3), pp. 466–476 © Cambridge University Press 2015  
doi:[10.1017/S0014479715000253](https://doi.org/10.1017/S0014479715000253)

## THE EFFECT OF THREE YEARS OF TILLAGE AND POULTRY MANURE APPLICATION ON SOIL AND PLANT NUTRIENT COMPOSITION, GROWTH AND YIELD OF COCOYAM

By ARUNA O. ADEKIYA†, TAIWO M. AGBEDE‡§ and STEPHEN O. OJENIYI¶

†*Department of Crop and Soil Sciences, Landmark University, P.M.B. 1001, Omu-  
Aran, Kwara State, Nigeria,* ‡*Department of Agricultural Technology, Rufus Giwa*

*Polytechnic, P.M.B. 1019,*

*Owo, Ondo State, Nigeria and ¶Department of Crop, Soil and Pest Management,*

*Federal University of Technology, P.M.B. 704, Akure, Nigeria*

(Accepted 5 October 2015; First published online 20 November 2015)

### SUMMARY

Tillage and use of organic manure are important agronomic practices that sustain high crop and soil productivity. Hence, a three-year (2007 to 2009) study was conducted to evaluate the effect of site, tillage and poultry manure (PM) treatments on soil and plant nutrients composition, growth and yield of cocoyam (*Xanthosoma sagittifolium*). The study was a  $2 \times 5 \times 5$  factorial experiment with two sites (Owo – site 1 and Obasoto – site 2), five tillage methods; manual clearing (MC), manual ridging (MR), manual mounding (MM), ploughing plus harrowing (P+H) and ploughing plus harrowing twice (P+2H) and five levels of PM (0, 2.5, 5.0, 7.5, 10.0 t ha<sup>-1</sup>). Treatments were replicated thrice. Soil OM, N, P, K, Ca, Mg and leaf nutrients reduced with increase in tillage intensity, thus MC conserved soil nutrients the most, and increased nutrient uptake. Soil and plant nutrient concentration was lowest under the P+2H treatment. The MC, MR and MM treatments led to faster growth and higher tuber yield. As PM increased from 0 to 10.0 t ha<sup>-1</sup> soil pH, OM, soil and plant N, P, K, Ca and Mg increased. The 7.5 t ha<sup>-1</sup> PM gave the highest leaf K, Ca and Mg values. Owo site had significantly higher yield and growth parameters of cocoyam compared with Obasoto site. Yield and growth parameters of cocoyam increased with increase in PM level up to 7.5 t ha<sup>-1</sup>. Out of all tillage cum manure treatments, MC+7.5 t ha<sup>-1</sup> PM gave the highest values of yield and growth parameter