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Response of soil properties and yam yield to Chromolaena odorata (Asteraceae) and Tithonia diversifolia (Asteraceae) mulches

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Plant materials differ in their chemical composition, rate of decomposition and suitability as mulch materials. Experiments were conducted during 2006–2007 and 2007–2008 cropping seasons for early yam cultivation at Owo in the forest–savanna transition zone of southwest Nigeria to study the effect of Chromolaena odorata and Tithonia diversifolia mulches applied at 0.0, 5.0, 7.5, 10.0 and 12.5 t ha^{-1} on soil chemical properties, leaf nutrient composition, growth and tuber yield of white yam (Dioscorea rotundata Poir). Both C. odorata and T. diversifolia mulches reduced soil bulk density and temperature; increased concentrations of soil organic matter (SOM), total N, available P, exchangeable K, Ca and Mg, leaf N, P, K, Ca and Mg; enhanced growth and yield of yam compared with control. The values of SOM, total N and available P and leaf N and P concentrations increased with increasing mulch rate. C. odorata mulch and T. diversifolia mulch applied at 10.0 and 7.5 t ha^{-1}, respectively, was found to be suitable for yam production. T. diversifolia mulch compared with C. odorata mulch produced higher values of soil chemical properties, leaf nutrient concentrations, growth and yield of yam. T. diversifolia mulch produced 19% and 18% higher tuber yield compared with C. odorata mulch during 2006–2007 and 2007–2008 cropping seasons, respectively.

Keywords: soil bulk density; temperature; soil chemical properties; leaf nutrient composition; Nigeria