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## Heritability Estimates of Arbuscular Mycorrhizal Colonisation in *Dioscorea* Species in Yam Growing Regions of Nigeria

MICHAEL DARE<sup>1</sup>, OLAJIRE FAGBOLA<sup>2</sup>, ROBERT ASIEDU<sup>1</sup>

<sup>1</sup>International Institute of Tropical Agriculture (IITA), Soil Microbiology Unit, Nigeria

<sup>2</sup>University of Ibadan, Department of Agronomy, Nigeria

### Abstract

Sustainable food crop production in sub-saharan Africa is being limited by scarce land resources. Tuber crops are very essential in meeting the daily calorie requirements of the population, which at present is growing at an annual rate that is more than that of food production. Nutrient deficiency in the soil can be ameliorated through the use of fertiliser and symbiotic microbes such as arbuscular mycorrhizal (AM). There is limited information on the mycorrhizal status of yam (*Dioscorea* species). Hence, this study was conducted to determine the AM colonisation status and the possible heritability in different yam growing regions of Nigeria. Multilocal trials were conducted in 2004 and 2005 using twenty-seven genotypes of *Dioscorea rotundata* (TDr) and twenty-eight genotypes of *D. alata* (TDa). Locations used were Ibadan, Abuja, Onne and Ubiaja using a randomised complete block design with three replicates in all locations. Parameters assessed include AM spore density, percentage AM colonisation. Data were transformed as appropriate and analysis of variance carried out. In addition, GGE biplot analysis was also carried out. Percentage AM colonisation of yam genotypes varied from 1 - 95.0. Genotype, location and genotype by location had significant ( $p < 0.05$ ) effect on the AM colonisation of yam. Broad sense heritability estimates for AM colonisation of TDr and TDa were 0.54 and 0.87 respectively. Combined analysis of genotype by environment interaction for AM colonisation revealed that TDr96/01799 and TDa00/0024 were the most stable while TDr Kokumo, Amula, 97/00903 and TDa00/00064, 98/01183 and 85/00250 ranked best in each three megaenvironments for TDr and TDa respectively. Spore density was highest at Ubiaja and lowest at Ibadan. Therefore, yam genotypes vary in AM colonisation and are influenced by environments.

**Keywords:** Arbuscular mycorrhiza, *Dioscorea* species, heritability, multilocal trials, soil fertility