

Varietal differences in tuber yield and fertilizer response in a F₁ mapping population of water yam (*Dioscorea alata* L.)

Ryo Matsumoto¹, Haruki Ishikawa¹, Sam Korie¹, and David De Koeyer^{1,2}

¹ International Institute of Tropical Agriculture, ² Agriculture and Agri-Food Canada

Introduction

Yam (*Dioscorea* spp.) is important for food security in West Africa. Development of high-yielding varieties and varieties with abiotic stress tolerance (low soil fertility) is strongly required. Although soil fertilizer management is one of the most interesting topic on the strategy, reported impacts on yam production have been inconsistent. The aim of this study are to clarify the varietal differences in tuber yield and fertilizer response, and to select varieties with low soil fertility tolerance within a segregating water yam F₁ population.

Materials and Methods

Ninety-four progeny clone derived from a cross between TDa 00/00194 (female, late maturity) and TDa 02/00012 (male, early maturity) were grown under field conditions at Ibadan, Nigeria. A field study evaluated the varietal difference in tuber yield and growth period of water yam when grown in with (90 kg N ha⁻¹, 75 kg K ha⁻¹, 50 kg P ha⁻¹) or without fertilizer in a field with low soil fertility condition. Growth period was calculated from sprouting date to senescence of the aerial part of each plant. The number of tubers and fresh tuber weight of each tuber produced by each plant were recorded.

Results and Discussions

A wide range of growth period and yield differences was observed within the tested clones. A significant interaction effect between fertilization and material on tuber weight was observed (Table 1), and the presence of some clones responding to fertilizer application was found within the tested clones (Figure 1). Differences in fertilization response could be a factor that has contributed to variable results in previous studies. In future experiments, we plan to clarify the physiological characteristics of fertilizer use efficiency and nutrient absorption in water yam.

Table 1 Summary of ANOVA table from mixed model analysis

	Num. df, Den. df	Tuber weight		Growth period	
		F	P	F	P
Treatment	1, 10	81.73	<.0001	3.47	0.0921
Variety	93, 847	6.93	<.0001	6.30	<.0001
Variety*Treatment	93, 847	1.69	0.0001	1.03	0.4093

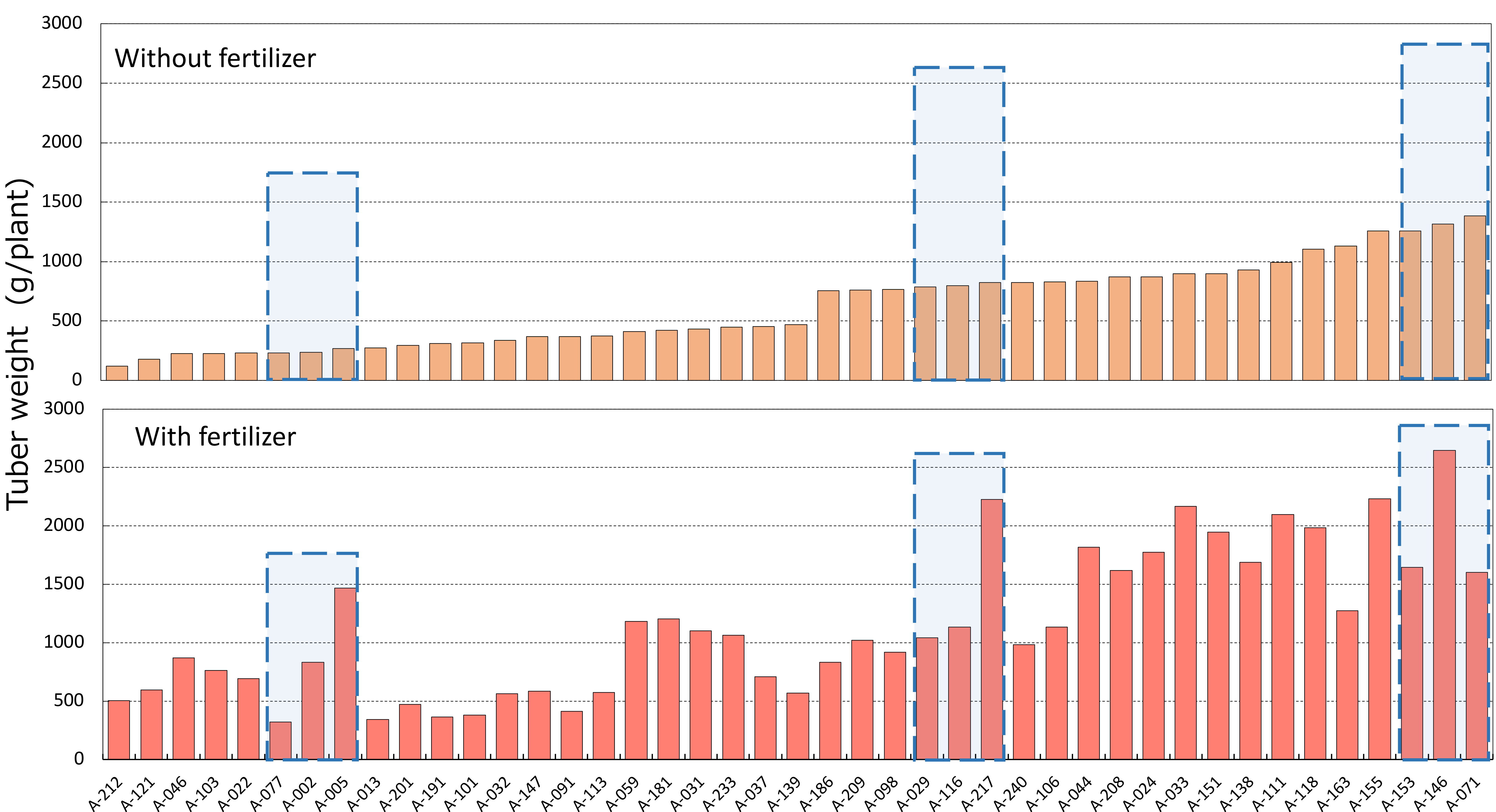


Figure 1. Varietal difference in fertilizer response of water yam

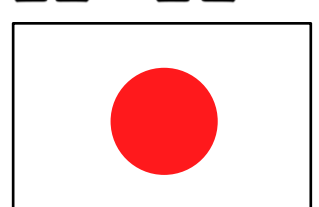
Contact:

Ryo Matsumoto

r.matsumoto@cgiar.org



The project funded by
MAFF



Ministry of Agriculture Forestry and Fisheries
JAPAN

IITA
Transforming African Agriculture



TROPENTAG 2018
GHENT
Ghent, Belgium
Sep 17-19, 2018

