

Effect of Depth of Water Table on Yields of Taniers^{1, 2}

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ABSTRACT

Taniers produced 9,880, 11,690 and 16,550 kg/ha of commercial tubers and 13,300, 18,100 and 29,100 kg of corms/ha when the water table of a Mollisol was maintained at depths of 15, 30 and 45 cm, respectively.

INTRODUCTION

Although taniers (*Xanthosoma* sp) are an important food crop of the humid tropics, there is little research information on their cultural requirements. In Puerto Rico, Abruña et al.⁴ determined the effects of plant population densities, fertilization and other factors on tanier yields. There is no information, however, on how water table levels affect tanier yields. Such information is needed in designing drainage systems and selecting areas best suited to this crop as production shifts from small fields in the mountainous region to mechanized production on the level coastal lands.

This study was conducted to determine the effect of the water table level on the yield of taniers.

MATERIALS AND METHODS

The experiment was conducted at Río Piedras at an elevation of about 30 m. Average annual temperature is about 26° C and average monthly variation is about 5° C. Annual rainfall is about 2,000 mm. The winter months are fairly dry. There are heavy rains in the fall.

Twelve concrete lysimeter tanks 1.2 m wide, 2.4 m long and 45 cm deep were used in the experiment. The lysimeters were filled with Toa clay loam (Mollisol), which was allowed to settle over a 2-month period to its normal bulk density of about 1.3. The soil has a pH of 5.8 and 3.8% organic matter. The exchange capacity is 22 meq/100 g of soil, and there are 14 meq of bases/100 g of soil.

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⁴ Abruña, F., Boneta, E., Vicente-Chandler, J., and Silva, S., Experiments on tanier production and conservation in Puerto Rico's mountain region, *J. Agri. Univ. of P.R.*, 51 (2): 167-75, 1967.

Sections of corms of the *Morada* cultivar weighing about 100 g each were used as propagating material. Taniers were planted at 40 × 80 cm equivalent to about 30,000 plants/ha, which is close to optimum for this crop as found by Abruña et al.⁴ Fertilizer was applied at the rate of 500 kg of 10-5-20/ha 3 and 6 months after planting. The taniers were planted in March 1977 and harvested in February 1978.

The treatments, replicated four times and initiated 4 months after planting, consisted of maintaining a free water table at 15, 30 and 45 cm below the soil surface. The water table was maintained at the desired levels in the lysimeter tanks by adjusting the level of water in connecting open tanks. The taniers were irrigated weekly except when rainfall was abundant.

RESULTS AND DISCUSSIONS

The following tabulation shows that yields of commercial tubers increased from 9,880 to 16,550 kg/ha when the water level was lowered from 15 to 45 cm:

<i>Depth to water table (cm)</i>	<i>Yields of taniers (kg/ha)</i>	
	<i>Tubers</i>	<i>Corms</i>
15	9,880 a ⁵	13,300 a
30	11,690 a	18,100 b
45	16,550 b	29,100 c

Although corm yields are higher than tuber yields, they are usually discarded. Soldevila and Vicente-Chandler⁶ recently showed that they are of value for feeding pigs.

These results show that the free water table must be kept at least 45 cm below the soil surface to obtain high yields of taniers.

RESUMEN

En un suelo Toa arcilloso lómico (Mollisol) se determinó el efecto del nivel de la nivel freática en la producción de la yautía a 15, 30 y 45 cm de profundidad.

La yautía produjo 9,880, 11,690 y 16,550 kg/ha cuando el nivel se mantuvo a 15, 30 y 45 cm de profundidad, respectivamente. La producción de madres (cormos) fue de 13,300, 18,100 y 29,100 kg/ha cuando el nivel se mantuvo a 15, 30 y 45 cm de profundidad, respectivamente.

Estos resultados señalan que es necesario mantener el nivel freático de los suelos sembrados de yautía a por lo menos 45 cm de profundidad.

⁵ Figures followed by the same letter do not differ statistically at the 5% probability level.

⁶ Soldevila, M. and Vicente-Chandler, J., Tanier corms as food for growing pigs, *J. Agr. Univ. P.R.* 52 (3): 283-289, 1978.