ASPECTS OF TARO PRODUCTION ON THE SHALLOW CALCAREOUS SOILS OF NIUE

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SUMMARY

Methods of subsistence taro growing on the Pacific island of Niue (19°S) are described. Also described in outline is a package of practices based on research that can substantially increase yields. The 'package' includes use of a siratrotaro rotation with siratro being undersown in taro and taro hulis being planted in siratro stubble killed by herbicides. Trials with responses to N, K and Zn are reviewed. Soil pH increases between 6.7 and 8.2 with percent coral sand and taro weight decreases linearly as pH rises, unless induced deficiencies are remedied. Foliar analysis confirms, and can be used to measure K and Zn deficiency. Iron may also be deficient at high pH.

RESUME

Les méthodes de la culture du taro de subsistance dans 1'île pacifique de Niué (19° S) on été exposées. De méme un paquet technologique permettant d'accroître sensiblement le rendement a été exposé dans ses grandes lignes. Le "paquet" comprend une rotation siratro-taro; 1'opération consiste à semer le siratro au bas du taro et á planter les hulis du taro sur le chaume du siratro détruit par des herbicides. Des essais de réponses a N, K et Zn ont été passés en revue. Le pH du sol accroît entre 6, 7 et 8.2 pour cent quand il s'agit du sable coralligène, et le poids du taro décroît de facon linéaire quand pH monte, à moins de pallier aux défaillances provoquées. L'analyse foliaire confirme et peut être utilisée pour mesurer le manque de K et de Zn. Le fer fait aussi probablement défaut quand pH est élevé.

RESUMEN

Se describen métodos de cultivo (de subsistencia) de malanga en la Isla del Pacífico de Niue (19°). Se reseña también un paquete de prácticas, basadas en investigacion, que pueden incrementar substancialmente los rendimientos. El "paquete" incluye el empleo de una rotación siratro malanga con el siratro sembrado antes de malanga para despues sembrar las "estacas" (hulis) de la malanga sobre el rastrojo del siratro, eliminado con herbicidas. Se revizan ensayos sobre respuesta a N, K y Zn. El pH del suelo se incrementa de 6.7-8.2 a medida que aumenta el porcentaje de arena coralífera y el peso de la malanga decrece linealmente a medida que el pH se eleva, a menos que las deficiencias inducidas se subsanen. El análisis foliar confirma y puede ser usado para medir deficiencias de K y Zn. El Hierro puede ser deficiente a pH elevados.

INTRODUCTION

The Pacific island of Niue is an isolated coral atoll of 26,300 ha which lies south of Samoa and east of Tonga at 19°S and 170°W. The Niuean people are Polynesians who have close cultural relationships with their Tongan and Samoan neighbours. Taro is the staple food, and on ceremonial occasions the number and size of taros presented by a family or village are a measure of vigour and status.

The humid tropical trade wind climate is favourable for crop growth. Mean annual rainfall is 2000 mm with about 60% falling during the warmer wetter season from December to April.

The principal soil parent material is volcanic in origin. Soil depths vary considerably over very short distances because of the irregularity of the underlying former lagoon and reef formations. Crop growth and natural vegetation reflect variations in soil depth. On substantial areas mechanical cultivation is impossible because of limestone outcrops, while in other places where the absence of rock allows the use of machinery, the mantle of soil over the underlying makasea (coral sand) is often so shallow that cultivation can result in mixing this sand with top soil. The consequent increases in calcium carbonate and pH aggravates trace element deficiencies.

Wright and van Westerndorp[1] presented a comprehensive account of the soils and agriculture of Niue, but this was before Widdowson's important work on zinc deficiency. In general the soils are classified as latosols of high base status with large amounts of aluminum and iron oxide clays. Silica content is low and mineral reserves of potassium are extremely low. Exchangeable potassium is also low on account of high

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