PHYSIOLOGICAL VARIABILITY IN THE MINERAL NUTRITION OF FOUR CASSAVA CULTIVARS IN FLOWING SOLUTION CULTURE

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SUMMARY

Results obtained since 1972 at the University of Queensland indicate substantial differences between cultivars Ceiba, UQ2, UQ5 and Nina in the rates of root development from stem tip cuttings in response to changes in substrate calcium concentrations and temperature in liquid culture. When rooted cuttings were grown in flowing solution culture, large differences were observed between cultivars in their response to calcium and to ammonium and nitrate nitrogen concentrations in the culture solution. Our data provide evidence of differences between genotypes in responses to nutrients and there may be some relationship, as yet undetermined, that would allow such methods to be of use in breeding cassava cultivars adapted to specific nutritional environments.

RESUME

Les résultats obtenus depuis 1972 à l'Université de Queensland révèlent qu'il existe des différences non négligeables entre les cultivars Ceiba, UQ2, UQ5 et Nina dans le taux de développement des racines à partir des boutures d'extrémité de tige en réponse aux changements dans les concentrations du substrat de calcium et aux changements de température dans une culture liquide. Lorsqu'on a cultivé des boutures de racine dans une solution de culture flottante, on a noté de grandes différences entre les cultivars dans leur réponse aux concentrations de calcium, d'ammonium et d'azote dans la solution de culture. Les données disponibles prouvent qu'il existe des différences entre génotypes en réponse aux élements nutritifs et il doiy y avoir une relation encore indéterminée permettant d'utiliser de telles méthodes pour la sélection et l'amélioration des cultivars de manioc adaptés à des milieux de nutrition spécifiques.

RESUMEN

Los resultados obtenidos desde 1972 en la Universidad de Queensland indican diferencias substanciales entre los cultivares Ceiba, UQ2, UQ5 y Nina en el grado de desarrollo de raíces, a partir de estacas terminales, como respuesta a cambios en la concentración ce calcio y temperatura en el sustrato líquido. Cuando se hicieron crecer estacas ya enraizadas en soluciones nutritivas recicladas se observaron amplias diferencias, entre cultivares, en cuanto a su respuesta a las concentraciones de calcio, amonio y nitratos presentes en la solución nutritiva. Nuestros datos proveen evidencias sobre diferencias entre genotipos, en respuesta a nutrientes y puede haber alguna interrelación, si bien no determinada todavía, que pudiera permitir que tales métodos fuesen usados en la adaptación de cultivares de yuca a ambientes nutricionales específicos a través de mejoramiento genético.

INTRODUCTION

The importance of cassava (*Manihot esculenta* Crantz) for food as a potentially cheap source of carbohydrate for livestock and for industrial purposes is now widely recognized. However, although considerable attention has been given to improving the overall agronomy of the crop and to the breeding of superior lines, relatively little attention has been paid to the physiology of cassava. Morphological differences between cassava cultivars are well known[2] and provide outward evidence of the genetic diversity among cultivars. Less is known about physiological variation, although limited evidence available suggests that this too may be substantial[3]. Large differences between cassava cultivars in their response to fertilizers, observed in Ghana (S.H. Evelyn, personal communication), provide further evidence for physiological differences in cassava.

MATERIALS AND METHODS

In order to investigate physiological differences between cultivars in nutrient response, studies were commenced at the University of Queensland in early 1972. We have mostly used culture techniques

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