

BREEDING TECHNIQUES, HERITABILITIES, INSECT RESISTANCE AND OTHER FACTORS AFFECTING SWEET POTATO BREEDING

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SUMMARY

A substantially higher percentage of progenies was within the acceptable range for most horticultural characters in crosses of parents which themselves have desirable phenotype. Selection pressure for skin and flesh colour can be made at an early selection stage of seedling growth. The honeybee and the bumblebee were the most efficient pollinating insects in a polycross nursery and showed preferences for profusely flowering cultivars. The flowers of breeding parents could be grouped on the basis of flower colour, size of corolla and position of stamens in relation to flower stigma. Centennial and ten other cultivars have their stamens below the stigma and cross pollination is necessary for seed set. Centennial was poorly compatible with ten new breeding parents used in breeding at Baton Rouge.

RESUME

On rencontre un pourcentage nettement plus élevé de descendants dans la série acceptable pour la plupart des caractéristiques d'horticulture dans des croisements de parents qui eux mêmes possèdent un phénotype désirable. La pression de sélection pour la peau et la carnation peut être faite très tôt au moment de la sélection de croissance des plantules. Les abeilles domestiques et les bourdons sont des insectes de pollinisation les plus efficaces dans une pépinière de croisements multiples et sont plus attirés par les cultivars qui fleurissent abondamment. On peut grouper les fleurs des parents en cours de sélection en fonction de la couleur des fleurs, de la dimension de la corolle et de la position des étamines par rapport au stigmate. Le Centennial et six autres cultivars ont leurs étamines en dessous du stigmate, ce qui rend la pollinisation croisée nécessaire pour la formation des graines. Le Centennial est peu compatible avec dix parents nouveaux en cours de sélection à Baton Rouge.

RESUMEN

Un porcentaje substancialmente más alto de progenies estuvo dentro del rango aceptable de la mayoría de los caracteres hortícolas de cruza de padres con fenotipo deseable. La selección por color de la cáscara y de la pulpa se pueden hacer en etapas tempranas del desarrollo de las plántulas. Las abejas y los abejorros fueron los insectos polinizadores más eficientes en un vivero para polícruzas, mostrando preferencia por los cultivares que florecieron más profusamente. Las flores de los padres híbridos pudieron ser agrupadas sobre la base de: color, tamaño de la corola y posición de los estambres en relación al estigma, lo que hace necesaria la polinización cruzada para la producción de semilla. Centennial fué poco compatible con diez nuevos padres híbridos.

INTRODUCTION

The polycross system³ of breeding as employed at Louisiana State University utilized additive gene effects by recurrent selection as well as employing the concept of homeostasis in assessing adaptation. Use is also made of epistasis and of the inheritance of major genes. As broad a gene base as possible is maintained.

Genetic characters for good horticultural traits have been selected since the inception of the sweet potato breeding programme in 1937, and most parental material is of such improved type. Only selected genotypes are used in the breeding nurseries for crossing by insects. Consideration is given to incompatibility groups in the establishment of nursery planting plans. *Ad hoc* nurseries have been used in the polycross system to breed for resistance to soil rot, soil insects, rootknot nematodes, other diseases and good horticultural characters^{3,7,8}. For genetic studies controlled crosses have been used^{1,2,3}.

It would be possible even with a low level of compatibility to obtain seed populations of sweet potato from known parents provided that the resources existed to make a large number of hand crosses. The polycross system on the other hand, using highly mobile insects as pollinators, affords the chance to obtain seed populations much more easily, but crosses are all of uncertain parentage.

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