THE STERILITY-INCOMPATIBILITY COMPLEX IN SWEET POTATO

G.A.M. van Marrewijk*

SUMMARY

Compatibility relations in sweet potatoes were assessed from the results of hand pollinations and ultra violet flourescence microscopy. Environmental conditions influenced compatibility reactions. Abnormal growth of pollen tubes in styles was common. Pollen sterility was assessed by germination on solid and liquid media and by staining with acetocarmine, lactophenol blue and tetrazolium salts and is not important. Female sterility however is a major factor determining the low seed set and seed viability.

RESUME

Les rapports de compatibilité dans la patate douceont été évalués à partir de résultats de pollinisations à la main et de microscopie flurescente ultraviolette. La croissance anormale des tubes polliniques dans les styles était fréquemment observée. La stérilité des pollens a été évaluée par la germination en milieu solide et liquide et par coloration aux sels acétocarmins, lactophénols bleus et elle n'est pas importante. Toutefois is stérilité femelle est un facteur important déterminant la formation lente des boutures et leur viabilité.

RESUMEN

Las relaciones de compatibilidad se determinaron a partir de resultados obtenidos por polinizacion manual y microscopía ultravioleta, fluorescente. El crecimiento anormal de tubos polínicos en los estilos fue común. La esterilidad del polen, la cual no es importante, se determinó mediante germinación en medio liquido y sólido y por coloración con acetocarmin, lactofenol azul y sales de tetrazolio. La esterilidad femenina, sin embargo, es un factor importante que determina la baja producción y viobilidad de simillas.

INTRODUCTION

Martin[5] has reviewed previous studies on incompatibility in sweet potatoes. Most authors have attributed poor fruit set to incompatibility, and have classified cultivars into distinct compatibility groups based on results of pollination between them. However, there have been discrepancies between the classifications of different authors suggesting either errors or differences due to experimental conditions or systems of classifying data.

Martin and co-workers were the first to recognize that a more complex system is responsible for poor fruit and seed set. In various publications[6,7,8] they pointed out that in sweet potato, beside the incompatibility system, there is a sterility complex which acts at different stages in the sexual cycle.

A study was started in 1969 at the Centre for Agricultural Research in Surinam to determine the relative importance of incompatibility and sterility mechanisms in reducing fruit set and seed formation in the sweet potato. This study included:

1. *In vivo* determination of compatibility relations.
2. Assessment of compatibility relations using fluorescence microscopy.
3. Pollen viability studies.
4. Female sterility studies.

METHODS AND RESULTS

Selfings and intervarietal crosses

About 35 cultivars of different origin were originally entered in the field pollination programme. Some of them flowered very poorly under our conditions and were excluded, when it appeared that classic ways to stimulate flowering, such as grafting on to non-tuberiferous *Ipomoea* species, shortday treatment, and nitrogen application, had little or no effect. This left only 27 clones in the programme. All clones were planted on ridges and trellissed along chicken wire to promote flowering and to facilitate crossing. Pollinations were carried out between 7.00 and 9.00, since it had been established previously that pollinations made later, under sunny conditions, caused a further reduction in fruit set.

*Centre for Agricultural Research in Surinam, Paramaribo, Surinam, S. America.