



CLONAL PROPAGATION OF PAPAYA THROUGH MICROPROPAGATION AND ROOTED CUTTINGS

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Summary

By selecting the best hermaphrodite Laie Gold and Rainbow papaya plants, micropropagating them from tissue culture and making rooting cuttings, we have been able to supply farmers with vigorous, uniform sized seedlings for transplanting into the field. This allows them to bypass the more wasteful and laborious process of planting several seeds per hole and thinning them later. The clonally propagated plants are more vigorous, high yielding and produce fruit lower on the fruit column.

Introduction

Papayas are typically grown by sowing multiple seeds per hole and the plants (female or hermaphrodite) are thinned to a single hermaphrodite plant three to five months later when they flower and the sex of the tree can be determined. This practice is wasteful of seeds and takes time and labor. Micropropagated hermaphrodite plants or rooted cuttings from them, allow the farmer to plant one tree per hole, reduce fertilizer use and eliminate the need for thinning seedlings. Also, the lack of available seed for the *Papaya ringspot virus* (PRSV)-resistant Rainbow papaya is a problem for some Hawaiian farmers. While micropropagation is expensive in terms of a skilled labor force, facilities, and consumables, rooted cuttings offer a simple, greenhouse-shadehouse technique that farmers and nurserymen can adopt in any location.

Methods

Micropropagated Laie Gold and Rainbow papaya from the best selected plants

initially served as stock plants from which the shoot is removed, rooted, and grown to transplant size. The micropropagated plants are initially grown in the HARC Aiea laboratory and shipped to Hilo. A population of about 200 Rainbow stock plants is currently maintained in a Hilo greenhouse and continuously provides clean shoots for rooting. The project also serves as an educational tool for training interested growers.

Micropropagated plants are started from apex and young lateral shoots. These are cut, soaked in 20% bleach and plated on agar. Each agar plate contains about seven shoots so that, at any given time, there are about 15,400 shoots on proliferation plates. After they have attained sufficient size, they are placed in rooting medium in sterile jars and eventually in sterile vermiculite.

The micropropagated plants are cut, the cutting rooted, and grown out in potting soil for sale to growers. Rooting success varied at different times of the year with highest rates obtained in April through September. Heavy losses from damping off occurred in November and December. The basal

portion of the original plants is allowed to regrow and can be cut again. Several improvements in the micropropagation and rooted cuttings protocol have been implemented and our success rate is now much better.

Discussion

The clonally propagated plants from our selected high yielding lines produce fruit earlier and lower on the fruit column, and have higher yields than thinned seedlings. The rooted cuttings are more vigorous and uniform in size compared to seed-grown seedlings. We have produced and sold about 17 acres of cloned papayas since late 2002.



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