

on changes in cyanide levels in cassava during processing. He is being supervised by Dr. R. D. Cooke of TPI, who is currently on secondment to the Centro de Investigaciones Tecnológicas de Alimentos, San José.

Jaime Gavilanes is doing his undergraduate thesis on tapioca (starch for human use) at the Universidad Central, Facultad de Ingeniería Química (Quito, Ecuador).

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Alvaro González is doing his graduate work on the storage of cassava products at California Polytechnic State University of San Luis Obispo (San Luis Obispo, CA, USA).

Armando Mendoza is doing his undergraduate thesis on the identification of cassava diseases in the zone of Moniquira (Boyacá) at the Universidad Tecnológica de Tunja (Tunja, Boyacá, Colombia).

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CENTRO DE INVESTIGACION Y MEJORAMIENTO DE ALIMENTOS

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Improvement of a propagation technique for cassava using single leaf-bud cuttings: a preliminary report

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The international transfer of cassava materials in the form of disease-free meristem cultures (1) requires that the newly introduced CIAT hybrids or varieties be rapidly multiplied upon arrival in the recipient countries. Conventional vegetative propagation of cassava is a very slow process: a plant can give 20 stem cuttings (20 cm long) per year at the best. Higher multiplication rates can be achieved (up to 36 000 stem cuttings/yr) through a rapid propagation method that utilizes shoots grown on two-node stem cuttings (2). This technique developed at CIAT has been used successfully in many countries.

The build-up of large amounts of planting materials as quickly and as free of disease as possible from a few imported clones requires the adoption of faster multiplication techniques.

In a recent cassava tissue culture course at CIAT (3), a new propagation technique developed by Philippine researchers (4) was presented by S. Tontyaporn, L.F. Patena & N. Zuraida (5).

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The technique in question utilizes single leaf bud cuttings as propagula and could become a valid alternative in the asexual propagation of cassava.

The single leaf bud cutting technique is being tested at CIAT in a joint project with the Philippine workers. Several modifications to the Philippine technique have been introduced in these trials in order to make it simpler and more efficient. The preliminary results of these trials are summarized herein.

The technique

1. The technique was tested with 6 cassava varieties at the age of 4 months. At least 100 single leaf bud cuttings were obtained from each mother plant. The number of cuttings was increased to 150-200 in mother plants having more than 2 branches. The vigor of the cuttings was increased as a result of girdling the stem and pinching off the shoot apex.
2. Each cutting comprised the leaf lamina (cut to less than one half its length), the petiole and its axillary bud. The amount of nodal (stem) tissue that accompanied the bud was critical in rooting. The cuttings were obtained directly in the field, placed in boiled, cooled water and carried to the rooting bed.
3. Best rooting was obtained with a substratum of coarse sand. The rooting bed was built under shade and protected against wind. Temperature fluctuated from 30-35 °C during the day and from 22-26 °C at night. Superficially planted cuttings grew faster than those planted deeper. Before planting, the cuttings were quickly immersed by their base in a rooting hormone, a fungicide and a hormone fungicide mix.
4. The cuttings were maintained under continuous mist during the first day; then the misting was intermittent and by the 5th-6th day the mist was stopped completely. Further watering was done with a hand watering can. At this stage all leaf lamina were cut off, leaving only the petioles as support for the cuttings.
5. At 8-10 days, the cuttings initiated roots and shoots. At this stage, the cuttings were transplanted to pots (jiffy or plastic and paper bags were utilized) and placed under a plastic cover for further growth and hardening. Some varieties rooted faster and better with the fungicide hormone mix; others did not require the hormone. Nearly 100% rooting was achieved with the hormone fungicide mix and with the cuttings obtained from girdled stems.
6. Eight days after potting, the plants were transplanted to the field.

Potential of the method

The following is a conservative estimate of the propagating potential of the single leaf bud cutting technique (see diagram).

1. From 100-150 single leaf bud cuttings can be obtained from a 4-month-old mother plant. Thus, 100-150 plants ready for field transplanting could be produced in 15-18 days.

2 In about 5 months 100 150 new mother plants will be available for propagation Each can give about 100 single leaf bud cuttings profuse branching varieties can probably give more

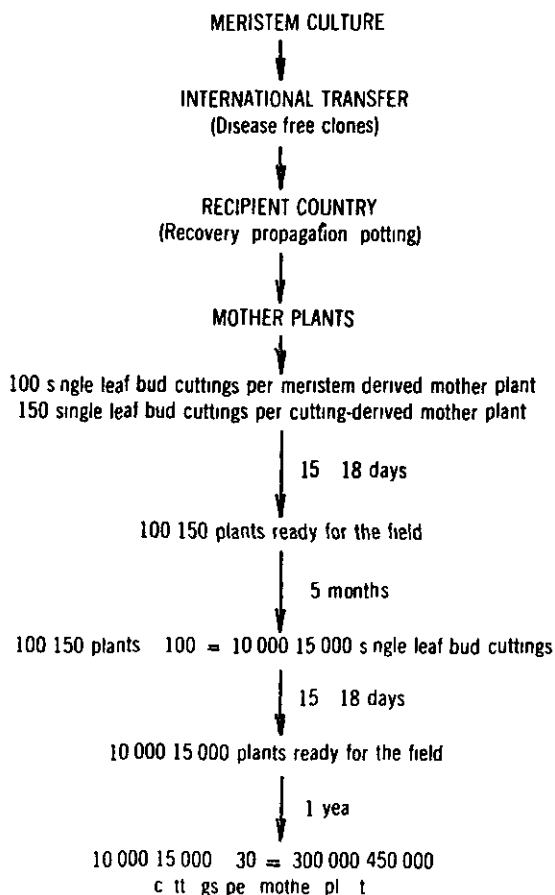
3 After 15 18 days 100 x 100 or 150 x 100 = 10 000 15 000 plants will be ready for field planting

Thus in about 6 months 10 000 15 000 plants can be produced from a single mother plant These plants after one year could produce 10 000 15 000 x 30 = 300 000 450 000 cuttings for commercial planting

4 From the standpoint of international transfer of cassava materials in the form of meristem cultures 10 mother plants can be sent in test tubes recovered and potted The number of cuttings produced in a year would increase to 3 000 000 4 500 000

In the case of large industrial plantations many more mother plants can be utilized at any one time thus the propagation potential of the technique is increased tremendously

PROPAGATION POTENTIAL OF THE SINGLE LEAF—BUD CUTTING TECHNIQUE



References cited

- 1 Centro Internacional de Agricultura Tropical 1978 Genetic Resources Unit In Annual Report 1978 Cali Colombia pp F5 F10
- 2 Cock JH Wholey D and Lozano JC 1976 A Rapid Propagation System for Cassava CIAT Series EE 20
- 3 Yuca Boletín Informativo No 7 1979 Curso de Entrenamiento para el Cultivo de Tejidos de la Yuca Efectuado en el CIAT Cali Colombia
- 4 Patena LF Barba RC and Estrella JB 1979 New rapid methods of cassava propagation by leaf bud and stem cuttings IPB Circular Institute of Plant Breeding University of the Philippines at Los Baños
- 5 Tontyaporn S Patena LF and Zurada N 1979 I Virus eradication of cassava by meristem culture II Rapid propagation of virus free cassava by leaf bud cuttings Project submitted in partial fulfillment of a training course on cassava meristem culture CIAT Cali Colombia

Biocidal properties of cassava seed oil

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Cassava is an important food crop in the tropics. The roots and foliage are used both fresh and dry for various purposes. However, not much information is available on the uses of cassava seeds and seed oil. Amongst various plant types of cassava, branching types produce abundant flowers and seeds. From 2-3 kg of seeds can be harvested from a single plant.

The cassava fruits are tricarpeal. The seeds resemble castor seeds, a good source of proteins, containing about 40% lipids which can be extracted by the usual methods (Nartey 1973). Extraction for 16 h using the Soxhlet method yielded 27-30% oil. The oil is pale yellow in color and has a very slight odor (Moorthy 1978).

In order to study the biocidal properties of cassava seed oil, the present investigations were begun with the cassava thrips *Retithrips syriacus* and the red spider mite *Tetranychus neocaledonicus*. Five concentrations (0.05, 0.1, 0.5, 1.0 and 2.0%) of cassava oil prepared with the help of an emulsifier (Teepol) were tested along with Teepol water and pure water under field conditions. Each treatment was replicated 4 times.

The nymphal population of *R. syriacus* and both adults and nymphs of *T. neocaledonicus* were counted before spraying and

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