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PROGRESS IN TISSUE CULTURE OF AVOCADO

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OPSOMMING

Volkome sukses is behaal met die vegetatiewe produksie van Persea indica deur middel van weefselkultuur. Daar is egter nog me in geslaag om Duke 7 in vitro te vermeerder nie. Fieperkte sukses is met punt-enting by Edranol behaal.

SUMMARY

Complete success was achieved with the vegetative production of Persea indica through tissue culture. Proliferation of Duke 7 in vitro was not successful. Limited success was achieved with tip grafting of Edranol.

INTRODUCTION

Tissue culture of avocados has been investigated in our laboratories since 1981. Partial success with *Persea americana* was reported last year but it was also stated that *Persea indica* reacted better and that plantlets were obtained (Nel and Kotzé 1982). As *P. indica* is very susceptible to *Phytophthora cinnamomi* and rapid propagation of this plant is urgently needed for root rot research, the earlier success was followed up. The search for suitable media to culture different commercial rootstocks and scion material continues.

MATERIALS AND METHODS

Young shoot tips (± 5 cm) of two year old seedling trees were used. Each tip was cut into a tip as well as one or two nodal cuttings which were cultured on the following medium. Marcro-elements: half strength Murashige and Skoog (1962) (MS) Micro-elements: Full strength (MS), FeNaEDTA (25 mg/ℓ) replaced the MS iron supply, Additions (mg/ℓ): sucrose (30000), NaH_2PO_4 $2H_2O$ (170), adenine sulphate (80), ascorbic acid (25), myo-inositol (100), glycine (2), gibberellic acid (1), pyridoxine HCl (1), thiamine HCl (1), nicotinic acid (1) and pantothenic acid (Ca-salt) (1).

A liquid medium with a filter paper bridge gave far better results than a medium solidified with agar.

For establishing the culture and for subsequent multiplication 2 mg/ℓ 6-benzylaminopurine (BAP) was added to the BM (Medium 1) and for rooting 2 mg/ℓ

indolebutyric acid (IBA) replaced the BAP (Medium 2).

RESULTS

Tip cuttings of *P. indica* as well as axillary buds from nodal cuttings developed well and after four weeks each one could be cut into three or four new explants. When these were again placed on Medium 1 the axillary buds on the shoots developed and up to 12 cuttings per tube could be utilized. Explants have been sub cultured up to seven times on Medium 1 but lost some of their vigour. We prefer to sub culture twice on Medium 1 before transferring to Medium 2 for rooting. Roots initiated within seven weeks on approximately 65% of the explants and the number increased to 80% when left for a longer period. Of-the rooted plantlete 50% survived transplantation into soil.

DISCUSSION

The preliminary investigation on the *in vitro* multiplication of *P. indica* has been concluded. Complete plantlets can be produced with a high percentage of success. A large number of plantlets have been established in the soil and are growing without any problems.

When using the above mentioned technique no success was obtained with Duke 7. Growth rarely took place and if a small shoot developed it soon turned brown and died. Alternative media have to be investigated. Amongst others the following adjustments to the BM was tried:

Inorganic salts: Full-and half strength MS and Knop solution.

Cytokinine: BAP, kinetin and 2-isopentyladenine (2:P) at different levels.

To prevent browning: Activated charcoal and polyvinylpolypyrrolidone.

Growth stimulants: Phlorglucinol and glutathione.

On some of the media development took place but the results could not be repeated.

Explants came from two different sources eg. mature plants from Westfalia Estate and young trees grown in the greenhouse. Westfalia material showed little growth and the percentage of fungal contamination was very high. The young trees were kept in a dark growth-cabinet at a temperature of 27°C for five weeks. Under these circumstances very little growth took place but when these plants were placed in the greenhouse vigorous young shoots were produced. These explants have given the best results to date and will be used as initial material in further trials.

Fifty Edranol seeds were obtained and the embryos were cultured. Germination was disappointing and only twenty were suitable for grafting. Out of these seven grafts grew from 0,2 mm to ±2 mm but developed no further. This technique must be improved before it can be used to any purpose.

Shoot tips from young Edranol seedling trees grew exceedingly well on the P. *indica* medium but to date no rooting has taken place.

FIG 1: *P. indica* plantlet before transplanting into potted soil.

FIG 2: Axillary buds developed on the shorts (left) and up to 12 cuttings could be made per tube.

FIG 3: *P. indica* plant (ex tissue culture) growing well in soil.

REFERENCES

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