PROJET DE REHABILITATION DE L'AGRUMICULTURE DE MINDANAO POUR UNE PRODUCTION DURABLE

Programme de coopération entre l'USM (Philippines)
et le CIRAD-FLHOR (France)

Rapport de mission aux Philippines
Du 24 au 31 janvier 2000

Philippe CAO-VAN
Agronome Fruitier

- Mars 2000 -

CIRAD-FLHOR Vietnam
C/o SOFRI, PO Box 203 - MY THO, Tien Giang - Vietnam
Tel : (84-90) 834.454 Fax : (84-73) 893.122 E-mail : caovan@netnam2.org.vn

Programme de mission aux Philippines
Du 24 au 31 janvier 2000

24/01 :	. Vol Ho Chi Minh Ville – Manille . Transfert Hôtel Las Palmas
25/01 :	. Vol Manille – Davao, accueil par Dr. Lydia OLIVIA . Transfert et installation à l'USM – Kabacan . Définition du programme de travail
26/01 :	. Suivi de l'introduction du matériel végétal certifié . Suivi du programme en socio-économie . Préparation de la conférence
27/01 :	. Conférence . Visite de pépinières privées
28/01 :	. Transfert à Wao, Lanao del Sur . Conférence . Discussion avec le Maire adjoint
29/01 :	. Aperçu de la région de Wao . Retour sur Davao
30/01 .	. Vol Davao – Manille . Transfert Hôtel Las Palmas
31/01 :	. Discussion téléphonique avec Service Culturel de l'Ambassade de France . Vol Manille – Ho Chi Minh Ville

Projet de réhabilitation de l'agrumiculture de Mindanao pour une production durable

Programme de coopération entre
l'Université du Sud Mindanao (USM) – Philippines
et le Cirad-flhor

Rapport de mission aux Philippines
Du 24 au 31 janvier 2000

Philippe CAO-VAN / Cirad-flhor

Cette troisième mission aux Philippines a été financée par le CIRAD afin de maintenir le suivi d'un programme décidé conjointement et suppléer partiellement à l'arrêt du soutien financier de l'Ambassade de France aux Philippines. Elle avait plusieurs objectifs :

- assurer le suivi des actions en cours
- mettre en œuvre l'amplification du matériel végétal certifié
- évaluer les sites proposés par l'USM pour la relance de l'agrumiculture
- analyser les possibilités d'évolution de ce projet

1. Etat d'avancement du projet

1.1 Notre partenariat avec l'USMARC – USM

Malgré une absence de quinze mois depuis la dernière mission (septembre 1998), nous avons eu le grand plaisir de constater que notre partenaire avait assuré un excellent travail et maintenu un enthousiasme de premier ordre au sein de l'équipe. Comme nous l'avions signalé dans notre précédent rapport de mission, la présence du Dr. Lydia OLIVA à la Direction de l'USMARC s'est confirmée comme un gage de réussite dans ce projet nécessitant à la fois l'acquisition d'une nouvelle méthodologie de travail et le soutien aussi fort que possible des professionnels de l'agrumiculture locale pour assurer un transfert technologique efficace et durable.

1.2 La production de matériel végétal sain

Lors de notre dernière mission, nous avions réceptionné sur le site le filet anti-insecte de maille 500 µm expédié de France (Financement MAE 1998 / Ambassade de France) et remis des semences de porte-greffes d'agrumes (Volkameriana et Citrange Troyer). Nous avions convenu de la restauration et de l'aménagement aux frais de l'USM d'une vieille structure métallique de serre (cf. planches photographiques en annexe).

Les travaux convenus ont été effectués et l'USMARC a également financé l'achat d'un complément de filet pour l'agrandissement de la cage d'isolement. Les sas d'entrée sont opérationnels et cette cage d'isolement présente toutes les garanties d'usage.

Le sol a été aménagé pour favoriser le drainage et les anciens bacs de semis ont été comblés et cimentés pour devenir des « tables » surélevées pour l'élevage des plants.

Un point d'eau permet l'irrigation au tuyau, méthode légèrement contraignante et perfectible certes mais ayant plus que largement fait ses preuves.

La fertilisation est assurée manuellement, au niveau du substrat de culture par des engrais en granulé, ou par des pulvérisations foliaires d'un composé enrichi en oligo-éléments.

Ces recommandations avaient été faites au cours de notre précédente mission et ont été parfaitement suivies. Les porte-greffes présentent un développement tout à fait convenable. Le savoir faire des responsables de cette cage d'isolement (Harem R. Roca et Quiober D. Calvo) a permis de maintenir les porte-greffes en procédant à un recépage, indispensable compte tenu du retard pris au cours de l'année 1999 pour procéder à l'introduction des greffons en provenance de la SRA de Corse. D'une part l'USMARC a rencontré quelques difficultés pour obtenir un permis d'importation de ces greffons qui a finalement était délivré par le Service BPI de la Province alors qu'il était refusé par la station BPI de Davao qui nous avait pourtant assuré de son soutien. D'autre part, la SRA n'a pu fournir la commande en 1999 en raison de problèmes de disponibilité en greffons. Ces contraintes ont conduit à retarder l'introduction des greffons, initialement prévue vers mai-juin 1999, jusqu'au moment de notre mission.

Des problèmes techniques rencontrés par le transporteur (EMS) n'ont pas permis, malgré une excellente coordination avec la SRA, de réceptionner ce matériel végétal durant notre mission. Celui-ci est arrivé à destination quelques jours après notre départ mais dans un état toujours très satisfaisant ayant permis un reprise à 99%. Une vingtaine de greffons ont été introduits pour chacune des variétés suivantes :

Lime mexicaine SRA 140
Calamondin SRA 665
Pamplemousse Pink SRA 322
Pomelo Oroblanco SRA 603
Or. Valencia Rhode Red SRA 360
Tangelo Orlando SRA 282
Mandarine King of Siam SRA 583
Mandarine Sunburst SRA 338
Mandarine Kara SRA 241

Ces variétés introduites complétent les huit (8) variétés récupérées auprès de la station BPI de Baguio (ex-Projet GTZ) où ont été introduites et conservées des variétés certifiées. Ces variétés en provenance de Baguio sont :

Citron Meyer
Citron Verna
Mandarine Ponkan « C »
Mandarine Ponkan « T »
Orange Washington navel
Orange Hamlin
Orange Trovita
Mandarine Satsuma

Parmi les variétés introduites de Baguio, prévues initialement pour une culture en altitude, les citrons et la mandarine satsuma auront très probablement un comportement médiocre en conditions tropicales de mousson. L'orange Washington navel devra être orientée préférentiellement sur les zones d'altitude moyenne (500-600 m).

1.3 Etudes socio-économiques

Conformément aux décisions prises précédemment, un volet d'enquêtes sur les aspects socio-économiques est en cours. Ce travail est sous la responsabilité de deux enseignantes de l'IDEM, également collaboratrices de l'USMARC. Il est confié à des étudiants dans le cadre de leur travail de mémoire de fin d'études universitaires (B. Sc).

Quatre questionnaires ont été élaborés (cf. Annexes) et servent de support d'enquête auprès de quatre catégories de personnes :

- Les producteurs
- Les grossistes
- Les vendeurs au détail
- Les consommateurs

Une soixantaine d'enquêtes ont été réalisées dans deux régions différentes, d'une part la province de Davao qui est une zone traditionnelle de production d'Agrumes et d'autre part dans des zones « non agrumicoles » de la région environnante de l'USM. Ces enquêtes, éclairciront les schémas de commercialisation des fruits, la fluctuation des cours durant l'année et les attentes des consommateurs. Elles préciseront également, pour les producteurs, leurs facteurs de contrainte.

1.4 Relations avec le BPI

Lors de nos précédentes missions, nous avions rencontré les responsables « Agrumes » de la Station BPI de Davao et le Directeur du BPI à Manille qui nous avaient assuré de leur soutien. L'expérience a montré, en ce qui concerne la Station BPI de Davao, une attitude très différente dans la pratique. Il semblerait que notre projet en coopération avec l'USM soit davantage perçu comme une concurrence plutôt qu'une contribution à la réhabilitation de l'agrumiculture. Cette attitude n'a été ressentie pour le moment qu'au seul niveau de la station de Davao et d'excellentes relations ont été développées avec la Station de Baguio et notamment avec la responsable « Agrumes », Mrs Juliette OCHAZAN, qui a eu l'occasion de visiter notre dispositif à la SRA de Corse au cours du dernier Congrès International des Pépiniéristes d'Agrumes (mars 1997). De bonnes relations ont été développées avec le Bureau de la Province de Cotabato.

2. Développement du projet

2.1 L'utilisation du matériel végétal introduit

Une séance de travail avec les responsables de la production de matériel végétal sain (Harem Roca et Quiober Calvo) a permis de rectifier la conduite des plants en pépinière pour l'amplification du matériel végétal. Les consignes laissées lors de la précédente mission ont

été revues et mises en pratique sur quelques plants produits à partir des greffons introduits de Baguio.

De nouvelles semences de porte-greffe (C. Volkameriana) ont été remises et devraient permettre la production de 3000 porte-greffes. Ils devraient être exploitables au moment de la première collecte de greffons selon l'exploitation ternaire définie. Un nombre suffisant de plants pourra ainsi être produit dans les mois à venir pour assurer à la fois la constitution d'un bloc d'amplification important et d'autre part la disponibilité de plants pour la mise en place de vergers de démonstration.

Des introductions complémentaires de matériel végétal sont nécessaires. Elles devront être ciblées en priorité sur l'ensemble des variétés d'origine philippines en collection à la SRA, sur le pamplemousse et sur les agrumes acides très utilisés comme condiments (Combava, Limes à gros fruits *Citrus latifolia*, hybrides de lime mexicaine comme le limequat, le calamansi,...).

2.2 Identification de zones potentielles pour la mise en place de vergers pilotes

Ce projet mené en coopération avec l'USM est complémentaire des actions entreprises au Vietnam dans le cadre de notre travail sur la lutte contre la maladie du huanglongbing (ou Greening) des agrumes. Compte tenu des moyens financiers limités, il est axé en priorité sur le développement d'une production de plants sains afin d'aboutir rapidement à la mise en place de vergers pilotes servant de support à une étude épidémiologique. Le contexte insulaire de Mindanao est en effet complémentaire du contexte continental du Vietnam, et la grande taille de cette île complémentaire par rapport à notre expérience insulaire de La Réunion.

Afin de placer ces vergers pilotes dans les meilleures conditions sanitaires, garantes de leur durabilité, il a été convenu de les établir dans des zones présentant un potentiel agronomique satisfaisant mais éloignées le plus possible des zones traditionnelles de culture des agrumes. Ces zones traditionnelles se concentrent dans le Sud-Est de l'île, principalement autour de Davao City et dans la partie Sud du Davao Oriental. Une première identification de zones isolées a été effectuée par l'équipe de l'USMARC en tenant compte à la fois du caractère d'isolement vis à vis des zones de production traditionnelle des agrumes mais également de l'intérêt potentiel pour une diversification vers l'agrumiculture. Deux zones sont aujourd'hui ciblées pour établir les premiers vergers pilotes :

- la zone de WAO (Province de Lanao del Sur), à 600 m d'altitude dans une région productrice de maïs, qui a fait l'objet d'une reconnaissance de notre part au cours de cette mission ;
- la zone de SULTAN KUDARAT (Province de Maguidanao dans la Région Musulmane Autonome de Mindanao), au niveau de la mer et également dans une région productrice de maïs. Cette deuxième zone devra faire l'objet d'une évaluation de notre part avant d'être confirmée dans le dispositif expérimental.

A ces deux zones, où pourront être établis des dispositifs expérimentaux en milieu paysan, sera ajouté un dispositif en milieu contrôlé sur une parcelle de l'USM située à CARMEN, Province de Cotabato.

Ces trois zones sont situées dans un rayon d'action facilement accessible depuis l'USM. Carmen est à 20 minutes de l'Université, Sultan Kudarat à 2h30 et Wao est accessible

par trois routes pour un trajet variable entre 4 et 8 heures. Lors de cette mission, les conditions climatiques (pluies assez importantes) nous ont obligé à prendre l'itinéraire le plus long mais la meilleure route. Les travaux en cours sur les autres routes devraient permettre un accès plus facile et plus rapide de Wao dans les mois à venir. La zone de Wao est particulièrement intéressante pour plusieurs raisons :

- La culture des agrumes n'y est pas développée traditionnellement. Des arbres (pamplemoussiers, orangers, calamansi) sont parfois cultivés dans les jardins mais en très faible quantité. Il semble d'ailleurs tout à fait possible d'envisager l'éradication de ces plants d'origine incertaine sous réserve de les remplacer par des plants garantis ;
- Le Maire adjoint de cette commune (M. Jeremy C. GUIAB) est particulièrement motivé par une diversification de la quasi monoculture du maïs ;
- Les agriculteurs sont facilement mobilisables par le biais de leur coopérative « maïs » (Mme Terry ROSAL, manager) et se montrent d'ores et déjà intéressés (leur participation et enthousiasme à la conférence que nous avons faite) ;
- Wao est à proximité de l'axe routier allant vers Cagayan de Oro, centre économique et portuaire d'importance vers l'ensemble du pays et particulièrement Manille, situé au Nord de Mindanao.

2.3 Information et formation

Afin d'appuyer le travail de notre partenaire, deux conférences ont été faites pour informer les pépiniéristes, les agriculteurs et les décideurs politiques sur la nécessité d'établir un réseau de production de plants sains et d'orienter leur utilisation principalement vers des zones « indemnes ». Les questions qui ont suivi cette présentation ont mis en avant le besoin d'organiser ce réseau, de former les partenaires de ce réseau et de s'assurer d'un soutien officiel.

Concernant l'organisation de ce réseau, il s'agit avant tout d'aider les pépiniéristes à travailler dans les normes requises. C'est donc l'organisation d'une assistance technique pour la construction des cages d'isolement (construction proprement dite mais également pour l'approvisionnement en filet « insect-proof » de maille 500 µm), pour la fourniture du matériel végétal (semences de porte-greffe, fourniture de greffons sains) et le suivi sanitaire.

La formation doit répondre aux besoins exprimés, à la fois par les pépiniéristes soucieux de travailler dans les normes requises mais aussi pour les agriculteurs désireux de se diversifier vers l'agrumiculture ce qui pour bon nombre d'entre-eux représente une nouveauté technique. Une réflexion est engagée avec notre partenaire USMARC-USM pour organiser une formation sur une semaine. La période reste à affiner, mais il serait souhaitable que cette formation puisse se dérouler en octobre-novembre 2000. Les enseignants de l'USM seraient impliqués mais la présence d'un expert du Cirad-flhor est très fortement souhaitée pour développer les « nouveautés techniques » à promouvoir. Ce point particulier a été évoqué avec l'Attaché Scientifique de l'Ambassade de France à Manille au cours d'une conversation téléphonique et a retenu son attention compte tenu des résultats obtenus. Le Poste dispose d'un certain nombre de billets d'avion (au départ de Paris) et pourrait étudier la possibilité d'en utiliser un au départ du Vietnam. Une autre possibilité d'aide à cette formation pourrait se faire par une réorientation des reliquats budgétaires (connus à partir de juillet).

Enfin, un soutien officiel est nécessaire pour la mise en œuvre du contrôle sanitaire des pépinières et la mise en œuvre d'un label de « qualité sanitaire » qui permettra de distinguer les productions traditionnelles de plants de celles faisant l'objet d'une garantie sanitaire. Cet aspect sera géré par notre partenaire avec l'appui des professionnels. Notre appui technique est néanmoins souhaité pour l'élaboration de normes.

2.4 Engagement des professionnels

Plusieurs associations de professionnels (pépiniéristes et agriculteurs) ont pu assister à l'une ou l'autre de nos conférences et les quelques visites sur le terrain qui ont suivi, ont mis en évidence une très forte adhésion à ce projet. L'évolution vers la production de plants d'agrumes sains représente un investissement non négligeable, principalement pour la constructions des cages d'isolement, que sont toutefois prêts à faire quelques pépiniéristes. Ils attendent en retour une véritable reconnaissance de l'amélioration qui sera apportée de façon à justifier le surcoût de production. Cet aspect semble accepté par les agriculteurs dans la mesure où le matériel sain est une base incontournable pour améliorer la durabilité et la rentabilité des vergers.

Ce soutien des professionnels apparaît comme un nouvel élément favorable à la mise en œuvre d'un programme de réhabilitation de l'agrumiculture de Mindanao. Il convient d'assurer un encadrement efficace de ces pépiniéristes ou agriculteurs « pilotes » de façon à poser les bases d'une production de qualité. L'USMARC est prêt à assumer ce rôle.

3. Conclusion

Cette mission a permis de poursuivre notre assistance technique et scientifique pour la mise en œuvre d'un programme de réhabilitation de l'agrumiculture sur l'Ile de Mindanao. Elle a permis de confirmer l'engagement de notre partenaire local (USMARC-USM) et de son rôle moteur dans la difficile tâche de rallier l'adhésion des professionnels à ce projet.

Ce projet de recherche-développement présente un intérêt grandissant pour cette coopération bilatérale. Du côté Philippins, les possibilités nouvelles de réhabilitation de l'agrumiculture représentent un enjeux économique d'importance, ce qui semble confirmé à la base par l'enthousiasme des pépiniéristes et des agriculteurs. Du côté français, les conditions expérimentales « insulaires » et l'adhésion entière de professionnels permettent d'envisager un complément scientifique au dispositif de recherche établi au Vietnam.

Il convient donc de poursuivre l'action que nous avons engagée dans cette île. Compte tenu des difficultés financières que nous rencontrons pour soutenir ce projet, et compte tenu de l'intérêt que représente ce dispositif pour notre étude sur la lutte contre la maladie du Huanglongbing des agrumes, un caractére prioritaire doit être affiché pour cette action. Cette priorité doit être mise en avant dans le cadre du dispositif régional animé à partir d'une base située au Vietnam.

Considérant par ailleurs le recentrage de nos activités scientifiques sur la thématique de la lutte contre le Huanglongbing, et un rapprochement possible avec l'Australie (Aciar), il serait souhaitable de pouvoir positionner le travail entrepris avec l'USM au sein d'une coopération multinationale au sein de la région Asie du Sud-Est.

Philippe CAO-VAN / mars 2000

Annexes

Annexe 1 : Carte de Mindanao – Philippines

Annexe 2 : Planches photographiques

Annexe 3 : Certificat de participation aux conférences

Annexe 4 : Plan de montage de cages d'isolation (modèles SOFRI)

Annexe 5 : Normes pour l'établissement d'un système de certification du matériel végétal agrumicole (Exemple de l'Afrique du Sud)

ANNEXE 1

Mindanao
Philippines

Annexe 2

Planche photographique

① Vue de l'ancienne serre de l'USM avant rénovation et aménagement (Oct. 1998)

② Vue extérieure de la cage d'isolement de l'USMARC-USM pour la conservation et l'amplification du matériel végétal Agrumes (Jan. 2000)

③ Vue intérieure de la cage d'isolement de l'USMARC-USM.
Elevage des porte-greffes pour l'introduction de matériel végétal et amplification.

④ Wao (Lanao del Sur) : zone de production de maïs présentant un potentiel agronomique et sanitaire favorable à une diversification vers l'agrumiculture.

Annexe 3

Certificat de participation aux conférences

University of Southern Mindanao Agricultural Research Center

Centre de Cooperation Internationale en Recherche Agronomique pour le Developpement

This

Certificate of Attendance

is presented to

_____

for attending the seminar on ***"Production of Disease – Free Planting Materials of Citrus"*** at the University of Southern Mindanao Agricultural Research Center (USMARC), Kabacan, Cotabato on January 27, 2000.

Given this 27th day of January 2000.

PHILIPPE CAOVAN
Agronome Fruitiers
CIRAD - FRANCE

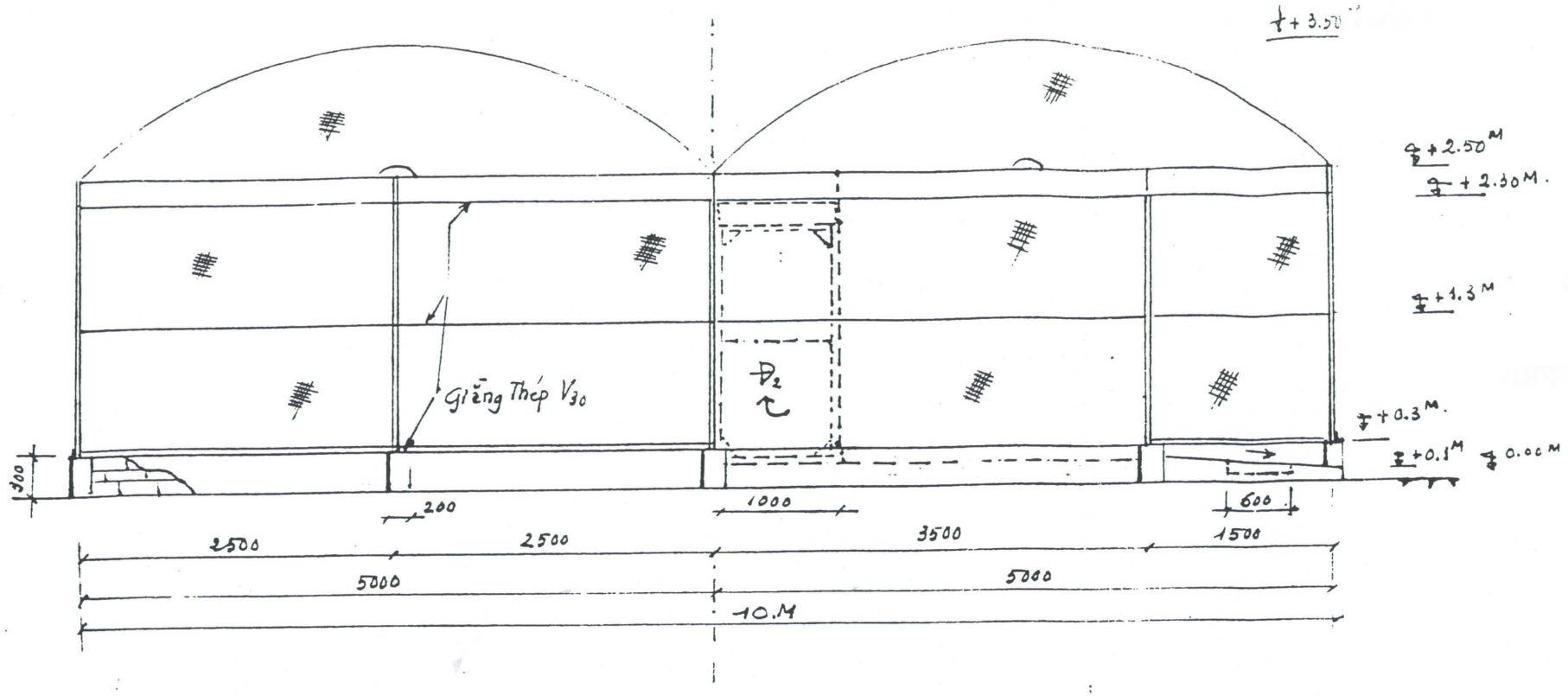
LYDIA P. OLIVA
Director, USMARC

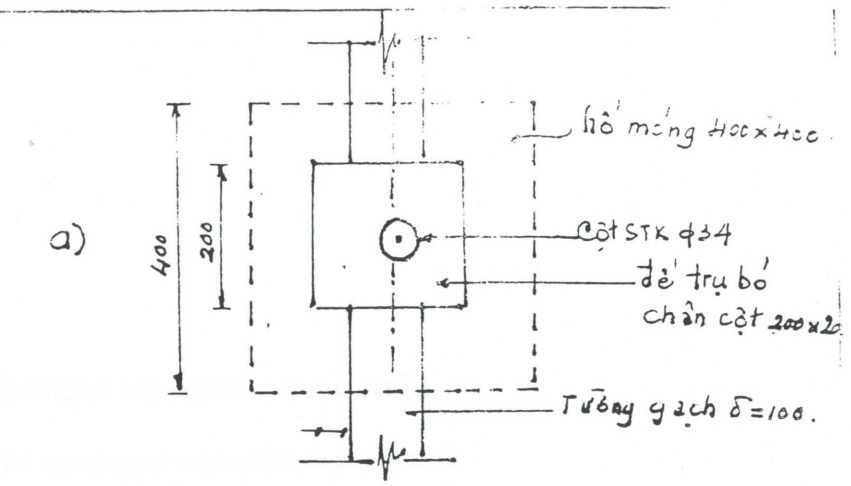
Annexe 4

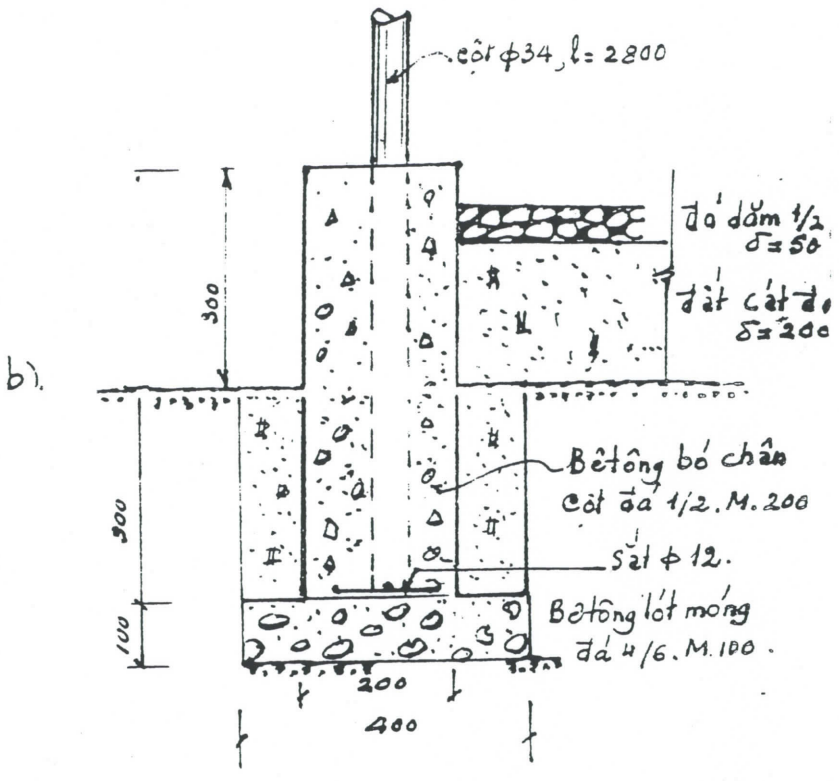
Plan de montage de cages d'isolation

2 modèles développés au Vietnam
par le « Southern Fruit Research Institute » (SOFRI)

KT2

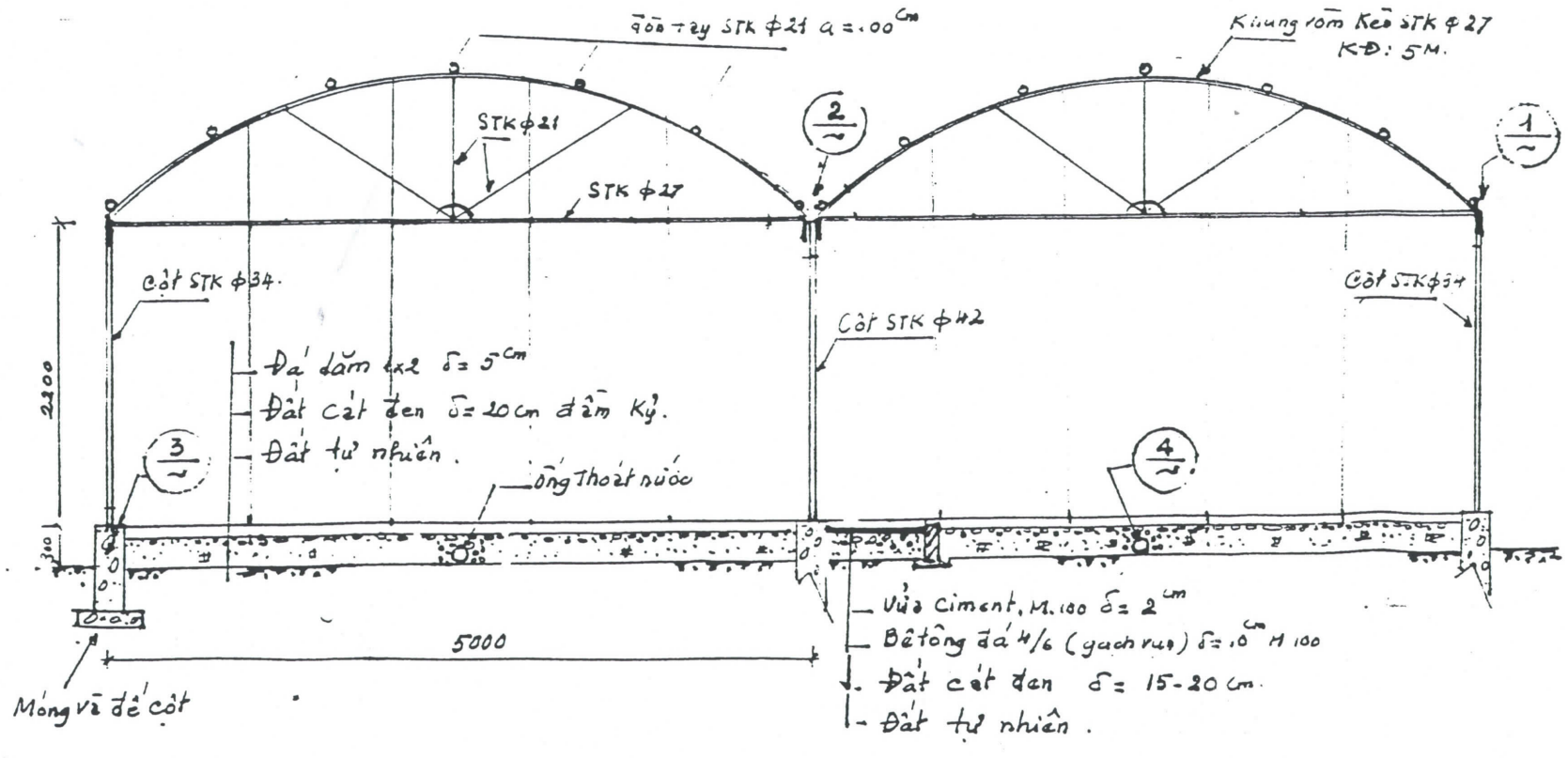


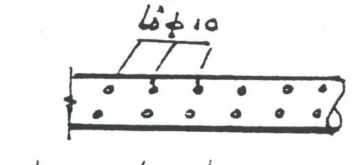




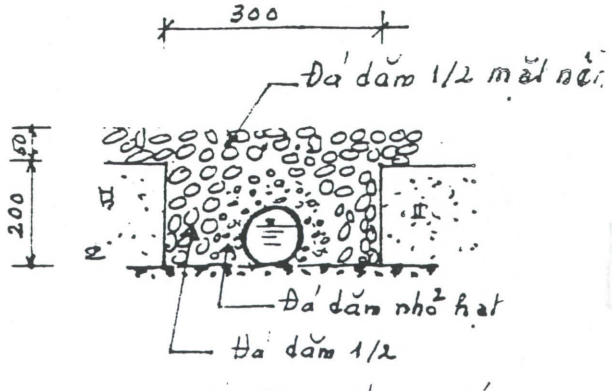
a). MẶT BẰNG MÓNG CỘT

b). CHI TIẾT (3)





ống Thoát nước φ90 PVC

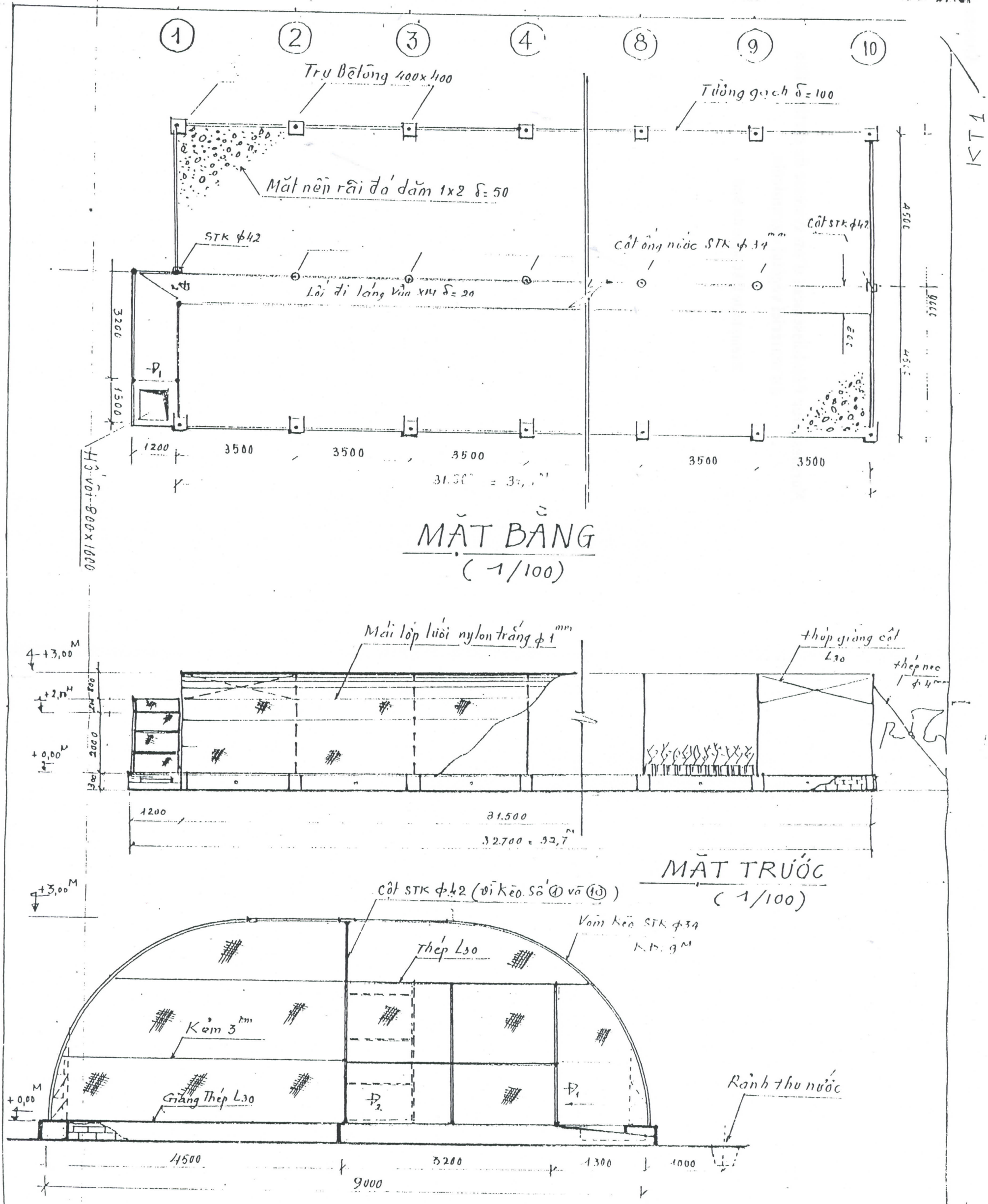


CHI TIẾT (4), cấu tạo ống Thoát nước φ90

Annexe 5

Normes pour l'établissement d'un système de certification du matériel végétal agrumicole

Exemple de l'Afrique du Sud


KT1
Trụ Bêtông 400x400
Tường gạch δ=100
Mặt nền rải đá dăm 1x2 δ=50
STK ϕ42
Cột STK ϕ42
Cột ống nước STK ϕ34
Lót đi lăng vữa XM δ=20
Hố vôi 800x1600
MẶT BẰNG
(1/100)
Mái lợp lưới nylon trắng ϕ1mm
thép giằng cột L30
thép neo ϕ14mm
MẶT TRƯỚC
(1/100)
Cột STK ϕ42 (vì kèo số ① và ⑩)
Vòm kèo STK ϕ34
Thép L30
Kèm 3mm
Giằng Thép L30
Rãnh thu nước
MẶT BÊN
(1/50)

A PROCEDURAL GUIDE

TO THE

SOUTH AFRICAN

CITRUS IMPROVEMENT PROGRAMME

1996

Andrew T C Lee
Outspan International
P O Box 12154
CENTRAHIL
Port Elizabeth, 6006
Telephone 041 52 3606
Facsimile 041 56 0272

CONTENTS

ANNEXURES

[1]Incomplete as at 24.4.96

S.A. CITRUS IMPROVEMENT PROGRAMME

1 INTRODUCTION

The purpose of the Citrus Improvement Programme (CIP) is to enhance the standard of the South African citrus industry by ensuring that only horticulturally superior plants which are free of declared viruses, diseases and pests are supplied to producers. Such plants are certified as **super grade**.

In order to achieve this objective close co-operation is required between the Outspan International (Outspan), the Institute for Tropical and Subtropical Crops (ITSC), the Directorate of Plant and Quality Control (DPQC) and approved citrus nurseries represented by the South African Citrus Nurserymen's Association (SACNA).

Various committees have been formed to co-ordinate the activities of the different organisations involved. A list of organizations and committees which are involved, listing their functions is given in Annexure 1.

2 FUNCTIONING OF THE SCHEME

The Citrus Improvement Programme (CIP) is a 4 phase project as indicated in the flow diagram in Annexure 2.

2.1. Phase I - Establishment of Nucleus and CIP Blocks

Original CIP material is stored at the ITSC in Nelspruit. The Nucleus Block is a facility that houses virus free material while the CIP Block houses nucleus material that has been pre-immunized with a mild isolate of citrus tristeza virus (CTV).

Apart from the selection of cultivars to be included in the CIP, all aspects in this phase are carried out at the ITSC.

2.1.1. Criteria for including a cultivar in the Citrus Improvement Programme

The responsibility for including new cultivars in the CIP lies with the Cultivar Co-ordination Group. For a cultivar to be accepted it must be:-

2.1.1.1 of a proven or anticipated commercial value to the Citrus Industry; and

2.1.1.2 based on yield and fruit size data known or expected to be capable of producing good yields of high quality fruit.

The person/s entering the new cultivar must complete the introduction form (Annexure 3) in conjunction with Cultivar Development, and forward with budwood of the cultivar, to the ITSC for inclusion in the shoot-tip grafting (STG) pipeline. Buds for STG must, where possible, be cut from behind normal fruit.

2.1.2. Selection of the actual parent source

2.1.2.1 In the case of local selections where only one tree or a limbsport exists budwood must be obtained from behind typical fruit.

2.1.2.2 Where more than one source exists the best tree must be selected based on horticultural evaluation and fruit obtained as in 2.1.2.1.

2.1.2.3 In the case of imported selections every effort is made to obtain selected material from reliable sources.

Imported material is placed in quarantine and must always be accompanied by an Import Permit.

Full details of the new cultivar are then recorded in the Cultivar Register (Annexure 4). The Cultivar Register is kept up to date at all times by the ITSC and copies of new entries are supplied to Outspan (MCIP) on a regular basis.

2.1.3. **Eradication of viruses and diseases**

2.1.3.1. Shoot Tip Grafting (STG)

All budwood undergoes STG to eradicate viruses. Imported material that has already undergone STG at recognised Institutes is indexed at the same time as undergoing STG. In this way if this material is free of viruses up to 6 months can be saved in releasing an imported selection.

2.1.3.2 Virus indexing (VI)

Once STG is complete the material is indexed for the following viruses:-

DISEASE	TEST	DURATION
Tristeza (CTV)	W.I. Lime	6 months
Tristeza (CTV)	Eliza	2 days
Exocortis (CEV)	Etrog Indexing	6 months
Cachexia (CCaV)	Parsons Spec. Indexing	12 months
Psorosis	Sweet Orange Indexing	12 months
Impietratura	Sour Orange Indexing	12 months
Tatter Leaf	Troyer Indexing	6 months
Greening	Sweet Orange or Minneola Indexing	6 months

2.1.3.3 Pre-immunization (PI)

All CIP material is pre-immunized with a mild isolate of CTV while the selection is undergoing indexing. This is done by budding a minimum of two pre-immunized grapefruit seedlings with material of the new selections. Where larger quantities of material are required for multiplication at the OFB additional pre-immunized grapefruit seedlings are budded according to the priority rating of the cultivar. In this way no time is lost once the material has been shown to be virus free. The pre-immunized material is kept in the CIP Block. Indexing for pre-immunization is done by Elisa and takes 2 days. Elisa tests are carried out at regular intervals.

Once successfully pre-immunised the material can be supplied to the Outspan Foundation Block (OFB) for evaluation and multiplication. Virus free material is kept in a tunnel at the ITSC as nucleus material.

2.1.4. **STG Timetable**

Detailed procedures and a timetable for the STG, VI and PI procedures are given in Annexure 5. This schedule shows that new cultivars being entered in the CIP take an absolute minimum of 2 years 8 months from first introduction to final release to nurserymen for commercial use as Super grade in the CIP. Imported material that is known to have undergone STG in approved facilities is indexed immediately - if virus free this can save up to 6 months (cf. 2.1.3.1). In order to keep the Industry informed of progress updates of the Cultivar Register are supplied to Outspan on a regular basis.

2.1.5. **Nucleus and CIP Blocks**

The Nucleus Block is a facility that houses virus free material while the CIP Block houses material pre-immunised with a mild isolate of CTV.

The Nucleus and CIP material are kept permanently by the ITSC in isolated glasshouses; 2 virus free plants and 2 pre-immunized plants are maintained per cultivar. This material is periodically tested for the presence of CTV and Greening. These glasshouses are inspected every 6 months by DPQC Inspectors to ensure they conform to the requirements of the Plant Pests Act.

CIP material which is included in the Scheme for the first time, will undergo primary propagation at the ITSC to supply sufficient budwood for OFB Phase II procedures. Therefore, for a period of at least 3 years, 2 primary increase trees must be available at the CIP Block in addition to the 2 pre-immunized nucleus trees, to facilitate the supply of approximately 200 buds per annum to the OFB.

All material in the CIP block destined for the OFB is cut and certified under the supervision of ITSC and Outspan officials (cf. Annexure 10). Only pre-immunized material can be used in the CIP with the exception of trifoliate and lemon selections.

2.1.6. **Re-indexing of Foundation Block Budwood and Seed Source Trees**

2.1.6.1 Tristeza (CTV)

As there exists a possibility that the isolate used for pre-immunization can change or break down, especially in non-grapefruit cultivars, and heat spells can cause temporary virus-free growth flushes where severe strains can establish, all trees are re-indexed every 3 years to establish the severity status of the CTV present.

2.1.6.2 Citrus Viroids (CV)

As these pathogens are easily transmitted by man, but no insect vectors are involved,

prevention of transmission is stringently applied. Re-indexing is done every 5 years.

2.1.6.3 Greening

Sweet oranges and Mandarins are self-indexing and are inspected annually for symptoms.

2.1.6.4 Other Viruses

As all the other viruses are transmitted by infected budwood the chances of re-infection at the OFB are minimal and re-indexing is done every 10 years.

To summarize, the re-indexing schedule is as follows:-

Virus/Viroid	Time Schedule
CTV	Every 3 years
CV	Every 5 years
Greening	Every year
Psorosis	Every 10 years
Impietratura	Every 10 years
Tatter Leaf	Every 10 years

2.2. Phase II - Evaluation of STG material

The purpose of Phase II is firstly to evaluate new selections for horticultural integrity and secondly to assess the value of the selection in comparable cultivar trials in different citrus areas.

This task is performed jointly by Outspan and the ITSC.

2.2.1. Horticultural Evaluation

The STG material once pre-immunized is sent to the OFB for horticultural evaluation and multiplication for experimental purposes; supply of this material is recorded as per Annexure 10. A minimum of 6 trees, of which 2 are on rough lemon, 2 on Swingle Citrumelo and 2 on Troyer citrange rootstocks are produced in the OFB nursery for planting in the OFB orchard, while trees on a suitable trifoliate hybrid rootstock are prepared for the increase block; the number of increase block trees budded depends upon experimental demand. Until evaluated this experimental material is supplied to growers at their own risk as non certified (Approved grade).

The first fruit evaluation is usually carried out within 2 years and all comments and results are recorded in the OFB Evaluation list (Annexure 6). Once the Evaluation Committee agrees that the cultivar is true to type, it can be released as Super grade.

If after 2 consecutive normal harvests the material can still not be certified as true to type, then the material in the nucleus block must be destroyed, and material from another suitable source must be selected and taken through Phases I and II. In this event all trees established at the OFB from this material are removed and destroyed.

Evaluations are carried out in early May and mid August each year by the Evaluation Committee in accordance with laid down procedures (Annexure 9). The Evaluation Committee reports at CIP meetings on evaluation committee findings (Annexure 6).

2.2.2. Cultivar Evaluation

Comparative trials are carried out in the most important citrus areas.

2.2.3. Foundation Block Nursery

As soon as a selection is recommended for release as Superplant material, trees on a suitable trifoliate hybrid rootstock are prepared for the increase block. The number of increase block trees budded depends upon commercial demand; a record is kept by OFBM.

2.3. Phase III - Supply of Propagation Material to the Industry

Phase III incorporates the multiplication of propagation material to be supplied to the nurseries and the continued evaluation of the budwood source trees in the OFB orchard. These tasks are administered by Outspan.

2.3.1. Outspan Foundation Block (OFB)

The OFB orchards consist of seed source trees (SST) and budwood source trees (BST) and are established with trees propagated in the Foundation Block nursery. A record of all SSTs and BSTs is kept by OFBM and MCIP. This nursery also produces trees for the multiplication of certified budwood; this is done in the increase blocks and the scion groves. Topworking of established trees as budwood (scion) sources may be done provided that the existing tree still contains the pre-immunized Nartia CTV mild isolate. New selections are included when necessary.

It is standard procedure to produce all seed source trees with STG budwood (not seed) from approved sources.

All budwood and seed source trees in the OFB orchard are given a code in accordance with the procedures laid down on p.13.

2.3.2. Propagation Procedures

2.3.2.1 Cutting Budwood for Increase Blocks

Budwood is cut by Outspan Foundation Block Manager, (OFBM) from behind normal

fruit on selected trees in the Foundation Block Orchards.

Once the leaves have been removed this material is then packed separately into plastic bags. The tree code is written on the bag, and also on two labels which are placed inside the bag for use on the first two trees in the increase block.

2.3.2.2 Treatment of Propagation Material

The budwood is taken into the laboratory and treated with suitable fungicides. It is then stored in marked plastic bags until it is ready to be budded onto seedlings in the increase blocks.

2.3.2.3 Budding of Propagation Material in Increase Blocks

Each selection is budded by one person and each section is labelled with the budder's name and the first two trees are labelled (cf. 2.3.2.1) with the tree code. Two trees are removed between each selection in order to make a distinct separation. A signpost with the reference code and budding date marks the beginning of each selection. The layout of each increase block is recorded by OFBM.

2.3.2.4 Choice of Rootstock for Increase Blocks

Increase material is budded on a suitably vigorous trifoliate hybrid so that rootstock shoots cannot be mistaken for scion material.

2.3.2.5 Colour Coding

Once the seedlings have been budded each container is marked by means of a colour code to prevent any chance of mixing. This is carried out before any sorting is done. The system is made up of different colours and numbers. The colour indicates the cultivar, as below:-

Navels	blue	Satsumas	white
Valencias	orange	Lemons	pink
Midseasons	brown	Grapefruit	grey
Clementines	yellow	Ellendale	red
Reticulatas	green		

The number indicates the selection in accordance with the first number in the code, eg.

Palmer Navel	N/01/075/A4	(Blue 1)
Delta Valencia	V/02/006/G5	(Orange 2)
Nules Clementine	C/01/106/A17	(Yellow 1)

2.3.2.6 Nursery Maintenance

Rootstock shoots are removed on a regular basis, strict pest control measures are applied at all times and general nursery maintenance is carried out on a regular basis.

Use is made of systemic pesticides to avoid aphid transmission of severe strains of CTV.

2.3.3. **Procedures for the supply of budwood**

2.3.3.1 Receipt of orders and allocation of material

Orders for commercial selections are co-ordinated by OFBM. Orders for experimental material are co-ordinated by MCIP. Where shortages exist material is allocated on a pro-rata basis. All orders, replacements, delays and non available material are recorded by OFBM and reported to MCIP.

2.3.3.2 Cutting of Budwood from the Increase Blocks

Cutting of budwood from the increase blocks is done under the supervision of OFBM and recorded according to the procedures in Annexure 14. During this process care is taken to ensure that cultivars are correctly identified, that suitable buds are cut, and to identify any stray shoots from the rootstock.

The cut material is placed into large plastic containers, marked with the relevant reference number and taken to the processing laboratory. Processing of the material is carried out in accordance with the procedures in Annexure 15.

Leaves are removed and the budsticks returned to another similar plastic container with the same label. Once all the budsticks of a particular selection have been trimmed they are cut into standard lengths of 25 cm. These cut budsticks are packed into smaller plastic containers with a label indicating the cultivar code. The working surface and floor of the laboratory are then cleared of all debris before work commences on the next selection. In order to maintain an even flow of work the next selection is cut in advance and placed in the cold room.

Counting of buds takes place on a separate working surface.

With the exception of Satsumas, the standard length of budwood used includes approximately 11 buds. For each 1000 buds, 120 budsticks are counted so as to include approximately 20% additional buds. With Satsumas there are only 7 buds on a standard length of budwood and 172 budsticks are required to obtain the same amount.

Budsticks that have been counted are treated with suitable fungicides, rinsed, placed into plastic bags with the code clearly written on the outside of the bag. The bags are sealed and stored per selection in the cold room. Only one selection at a time is handled during counting, treatment and packing.

2.3.3.3 Expiry of Increase Blocks

The increase blocks housed in tunnels and the shadehouses are cut for only 30 months after initial budding to limit to approximately 200 the number of buds multiplied from a

single bud. The open ground increase blocks (scion groves) are allowed to come into bearing to test for horticultural integrity, whereafter budwood cutting can continue.

2.3.3.4 Despatch of Material

All administrative procedures at the OFB are carried out by OFBM and all material is certified by Outspan. The OFB invoice serves as the certificate (Annexure 11).

Parcelling of each consignment is done under supervision of OFBM, and each separate consignment is labelled. These consignments are packed into cartons of suitable size and sealed. The invoice, which serves as proof of the certification status of the material, is included with each consignment.

Consignments are sent either by courier or by express airmail and are only sent on Mondays and Tuesdays to ensure that they reach their destination timeously.

2.3.4. Procedures for the supply of seed

One cultivar at a time is harvested and processed to avoid mixing the seed in accordance with the procedures in Annexure 16. A supply of fruit is stockpiled in cold storage.

All seed is washed, treated in hot water at 51,5°C for ten minutes and treated with a suitable fungicide directly after the hot water treatment. The seed is then surface dried and stored in marked plastic bags at 6°C. Germination tests are carried out on a regular basis to check seed viability.

Orders, allocation, packing, certification and despatch are carried out in the same way as for budwood.

2.4. Outspan Foundation Block Evaluations

All trees per selection are evaluated on an annual basis for yield, fruit size, horticultural stability, ie. presence of chimeras, and general tree condition. These evaluations are carried out by the Evaluation Committee. Internal quality tests using a 12 fruit sample are also carried out per tree.

In view of the spread in maturity dates of the selections at the OFB evaluations are carried out in early May and mid August. The OFB evaluations are co-ordinated and administered by Outspan.

2.5. Phase IV - Administration

This phase, which is Outspan's responsibility, consists of the maintenance of records of all Super and Approved grade material supplied to nurserymen and all certified trees sold to growers.

In this way the material used for certified trees can be traced to its origin and Industry

trends can be monitored accurately.

3 NURSERY PARTICIPATION

3.1. Nursery Registration

It is required by law that any establishment concerned with the production and sale of fruit trees (citrus and other) must register as such. Registration forms are obtainable from the Director, Directorate Plant and Quality Control (DPQC).

To join the S.A. Citrus Improvement Programme it is necessary for a nursery to register as a CIP participant. Application forms are obtainable from the Manager, Citrus Improvement Programme, P O Box 12154, 6006. Telephone (041) 523606, Facsimile (041) 560272.

Registration covers the period 1 April to 31 March of the following year.

Before a participant is permitted to receive certified propagation material from the Outspan Foundation Block (OFB) for the purpose of producing certified trees, the nursery has to be approved by Outspan. Application for approval is made on the appropriate form and submitted to Outspan (Annexure 12). Approval will cover the nursery until 31 March of the following year. Approval applied for after 1 April will cover the remaining part of the year up until 31 March of the following year.

3.2. Requirements for nursery approval

Qualification for nursery approval is based on a number of statutory requirements and also, in respect of certain aspects, on the discretion of Outspan's representatives. The following requirements should be met:

3.2.1. In the case of open ground nurseries the nursery must be established on soil which is free of harmful pathogens and which cannot be contaminated with run-off water from other citrus plantings in the vicinity.

3.2.2. Run-off irrigation water used in the nursery must be led away out of nursery area by means of a suitable drainage system.

3.2.3. Irrigation water used in all nurseries must be free of pathogens harmful to citrus.

3.2.4. In the case of container nurseries, the growing media must be free of harmful pathogens and must not be mixed or stored on a surface which is or may be infected.

3.2.5. The roots of trees in containers must not be permitted to come into contact with infected soil. This implies, though does not demand, that container plants should be lifted off the ground in some way. This is in order not only to avoid spread of root diseases, but also to ensure that no roots are left behind when

the tree is removed from the nursery.

3.2.6. Nurseries must make use of practices that will ensure that their trees are certifiable in terms of the CIP.

3.2.7. Nurseries must make use of propagation material from the Outspan Foundation Block.

The CIP makes allowance for two categories of membership; commercial nurseries qualify as full members and growers producing only for own use qualify as associate members.

3.3. Withdrawal of Approval

Approval as a CIP participant will be withdrawn should an approved nursery fail to meet CIP requirements. Criteria for withdrawal of approval are as follows:-

3.3.1. If *Phytophthora* is found repeatedly, i.e. on more than two occasions in the same sections and this represents more than 25% of the nursery.

3.3.2. If *Phytophthora* is repeatedly found in the nursery and no effort is made to correct the situation, i.e. control/eradication recommendations are ignored.

3.3.3. If for any other reason the nursery repeatedly fails to meet CIP requirements.

Nurseries not meeting CIP requirements will be given written notification of the pending withdrawal of approval.

A nursery that has had its approval withdrawn will requalify for participation as soon as CIP requirements are met.

3.4. Application for and allocation of budwood

A list of nurseries approved for participation in the CIP is available from Outspan Extension Offices or the CIP Secretary, P O Box 12154, Centrahil, 6006, telephone 041 523606. This list is updated on a regular basis.

Budwood requirement forms are sent to these approved nurseries three times a year ie. June, February and October. The October forms cover the estimated budwood requirements for the period 1st December to 31st March of the following year, the February forms cover the estimated budwood requirements for the period 1 April to 31 July and the June application forms cover the period 1st August to 30th November. These requirement forms list commercial cultivars and give estimated quantities of experimental selections available from the OFB. In the event of newly released selections being in short supply budwood is allocated on a prorata basis.

3.5. Application for seed

During March of each year seed application forms are sent to all approved nurseries.

They cover the seed requirements for the current year. Seed is issued as it becomes available.

3.6. Tree Certification

3.6.1. Application for tree labels

Tree certification is based on the results of the Nursery Advisor visits (cf. 3.5.2). The CIP makes provision for the labelling of each certified tree, should growers require it. Large consignments of non-labelled trees may be sold as certified however, provided that the nurseryman supplies the grower with confirmation that the trees are certifiable. The tree register (Annexure 8) is used to apply for certificates, the completed forms are sent to the CIPSEC for processing. Certificates are issued for each consignment of certified trees, whether labelled or not. This dual system has been designed to enable growers to identify the status of trees in the nursery, should they require it, as well as to provide a permanent record of certified trees planted.

Once the trees produced from certified budwood are nearing saleable/certifiable size, the nurseryman applies in writing for sufficient labels to enable every certifiable tree to be labelled individually. Applications are made on a standard form, which can be obtained from the CIP Secretary (cf. Annexure 7). On receipt of the completed label application form and prior to issuing the labels the details on the form will be checked against the relevant budwood invoice to ensure that no errors have occurred. It is therefore essential that accurate records are kept by the nurserymen of the Outspan Foundation Block (OFB) invoice number and the tree code of each budwood consignment received from the OFB. Once this stage has been verified the labels with all the required details printed on them are forwarded to the nurseryman. Individual nurserymen carry the cost of the labels used by themselves.

3.6.2. Monitoring and certification

Outspan Nursery Advisors monitor approved CIP nurseries on a regular basis. Certification of trees is based on the results of these visits and only trees produced from OFB budwood and conforming to the following standards are certifiable.

- All trees must be healthy in all respects and not be suffering from any serious mechanical damage.
- The trees must have a healthy, well developed root system free of any abnormalities. The roots of plants in containers should not penetrate the ground beneath the container. A nematode sample will be taken at least once from every batch of nursery trees and Phytophthora samples will be taken for analysis on a regular basis. If the results are positive the trees will not be certifiable.
- The trees must be free of declared pests and excessive insect damage.
- The stems of all trees must be straight.

- In the case of a budded tree, the bud-union must be at least 200 mm above soil level, and the scion must have grown at least 150 mm above the bud union (see Annexure 13 for detailed description).
- With the exception of trees produced on dwarfing rootstocks the above standards must be met within 20 months of budding.

Certified trees fall into the following categories and must be described as such to the grower.

Mini-tree	A tree showing bud (scion) growth of at least 15 cm.
Whip tree	A tree without any scaffold-branches, but with the stem already hardened off at the intended topping height. Trees may therefore be topped at any height to suit the grower's requirements.
Scaffold tree	A tree which has formed scaffold branches at a height required by the grower, with a stem thick enough to support the scaffold.

It is essential that the growers are aware of these categories and that they are aware of what size trees they will receive.

3.7. Administrative Procedures

The nurseryman is required to keep a register of all certified trees sold from his nursery and to submit an update of this register every month to the Manager CIP. This permits trees to be traced back to their budwood origin should this be necessary at any stage (Annexure 8).

If the nursery's records are computerized a print out in a similar format will suffice both for label applications and tree sales.

4 CULTIVAR REGISTER

4.1. Coding System

The Cultivar Register documents all details pertaining to cultivar selections included in the CIP. These details include reference to the origin and history of each selection (Annexure 3). To facilitate computerisation, all numbers involved in the identification and registration of selections are generated from the Cultivar Register.

4.1.1. Register Number

The register number is the consecutive number of the Cultivar Register.

4.1.2. Cultivar Code

The cultivar Code comprises a single alphabetic character which identifies the

cultivar group to which that selection belongs:-

C - Clementines
D - Diverse scions and hybrids
E - Ellendales
J - Shaddocks
K - Kumquats
L - Limes
M - Midseasons
N - Navels and early maturing sweet oranges
O - Rootstocks
P - Grapefruit
R - Reticulatas
S - Lemons
U - Satsumas
V - Valencias and late maturing sweet oranges

4.1.3. **Selection Number**

The selection number is a double digit which combines with the Cultivar Code to indicate the name of a specific selection, eg. N/01 refers to Palmer navel and V/01 refers to Olinda valencia.

4.1.4. **STG Number**

The STG number refers to the number of the specific shoot tip graft explant and comprises two digits, eg. 15 which indicates the explant number 15.

4.1.5. **OFB Tree Number**

The OFB number consists of a single alpha character and two numeric digits, which indicates the position of the specific seed or budwood source tree in the OFB orchard, eg. D12 refers to row D, tree number 12.

This number is only inserted into page one of the register when the final evaluation is completed.

4.1.6. **CIP Number**

The CIP number is unique for each selection and budwood source tree at the OFB which is included in the CIP. The number is systematically put together during Phase I, II and III of the CIP, and has the following format:-

Cultivar Code/Selection No./Registration No./STG No./OFB Tree No.

For administration purposes the STG number falls away once the selection is

planted out into the OFB orchard. This number is then replaced by the OFB tree number, ie. the map reference of the tree.

Example

A CIP number such as C/04/020/14/B10 therefore originates as follows:-

The Clementine selection SRA63 is number 20 in the Cultivar Register and refers to the specific OFB tree of STG explant No. 14 which is plant in row B, at the 10th position in the OFB orchard. In this case the 14 is replaced with B10, and the number would therefore actually be:-

C/04/020/B10

The Cultivar Register is kept up to date by the ITSC as new selections are included in the CIP. A copy of this register is supplied by the ITSC to MCIP; it is updated as required.

ANNEXURE 1

ORGANIZATIONS AND COMMITTEES INVOLVED IN THE CIP

1. **Directorate Plant and Quality Control (DPQC)**

The DPQC is responsible for applying the Law for Plant Improvement Programmes and assumes the regulatory functions of the CIP, which are carried out on their behalf by Outspan International (Outspan).

2. **Outspan International (Outspan)**

Outspan is responsible for funding the CIP and carries out the multiplication and distribution of certified propagation material from the OFB. Outspan also administers the scheme and is responsible for the inclusion of cultivars in the CIP.

3. **Institute for Tropical and Subtropical Crops (ITSC)**

The ITSC carries out the production of true to type disease free material in accordance with Phases I and II of the CIP. The ITSC is also involved in the selection of cultivars for inclusion in and release by the CIP.

4. **Outspan Foundation Block (OFB)**

The OFB is the farm near Uitenhage in the Eastern Cape which Outspan has established as a facility for the multiplication of certified budwood and seed.

5. **CIP Co-ordinating Committee**

This committee chaired by Outspan, consists of officials involved in the CIP from Outspan, the ITSC and DPQC, as well as SACNA representatives. This annual meeting is held to report on progress and discuss practical and technical problems pertinent to the implementation of the CIP. This committee is also responsible for the final formulation of proposals for the implementation of the CIP.

6. **Cultivar Co-Ordination Group**

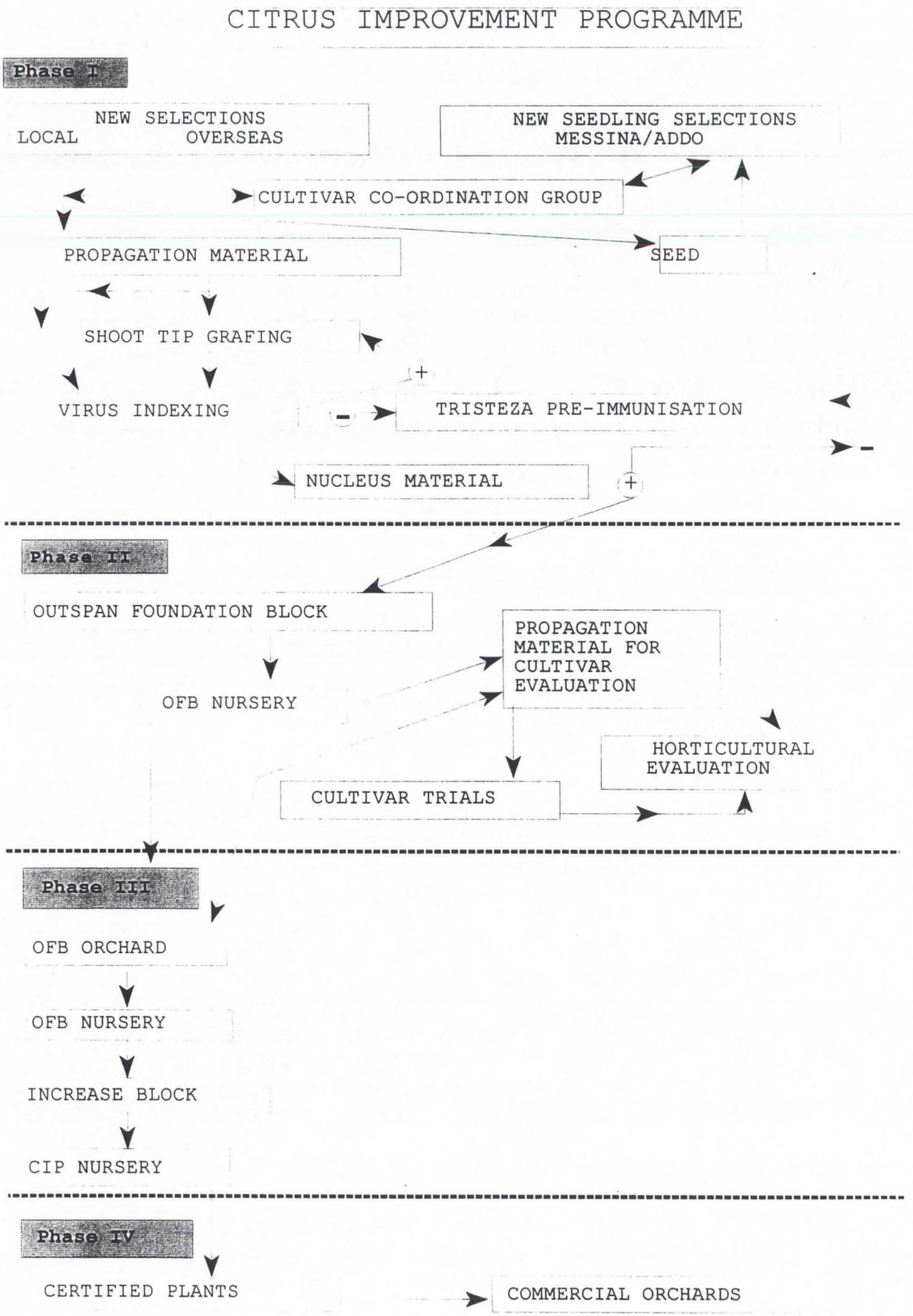
This committee chaired by Outspan, consists of Horticulturists from Outspan and the ITSC. This committee is responsible for selecting all new cultivars for inclusion in and release by the CIP as well as being responsible for drawing up recommendations for the breeding and mutation programmes.

7. **Evaluation Committee**

This committee, chaired by Manager, CIP, is responsible for the evaluations at the OFB and consists 4 Horticulturists, and a Virologist. A SACNA representative and 2 growers are co-opted as observers.

ANNEXURE 2

FLOW DIAGRAM OF CITRUS IMPROVEMENT PROGRAMME PROCEDURES



ANNEXURE 3

INTRODUCTION OF CITRUS SELECTION

Cultivar: _____ Selection: _____

Plant Breeders' Rights: YES/NO

Type of Material: Budwood ☐ Seed ☐ Tissue Culture ☐

Origin: Address Importer Details (overseas source)

....
....
....

Motivation for Introduction:

.....
.....
.....

SUPPLIER DATE

_____ _____

QUARANTINE ADMIN:

Material received by: _____ Date _____

Material handed to: _____ Date _____

CIP ADMIN

1. Date of inclusion: _____

2. Cultivar No.: _____

3. CIP NO.: _____

4. Released to Outspan Foundation Block.

Comments: _____
_____
_____
_____

_____ _____

SIGNATURE **DATE**

ANNEXURE 4

CULTIVAR REGISTER

This is a dBase file with the structure listed below:-

Details of all cultivars in the CIP are recorded in this file which is updated on a monthly basis by the ITSC.

This file includes the following information:-

1. CIP Register Number and Code.
2. ITSC Number.
3. Priority Rating.
4. Selection.
5. Reference (to origin and motivation on Annexure 3).
6. Date introduced (buds to ITSC).
7. Date STG.
8. Date Indexed.
9. Date Virus Free.
10. Date pre-immunized.
11. Date CTV positive.
12. Date sent to OFB (first time).
13. Date approved as true-to-type.
14. Status (includes approval by Cultivar Committee as "Super").

ANNEXURE 5

TIME SCHEDULE FOR STG AND INCLUSION OF MATERIAL IN THE CIP

DAYS	PROCEDURE
1	Buds received and budsticks placed in vitro in growth cabinet.
60	Tender shoot tips taken for STG - budded plants held in growth chamber.
90	Small STG plants topworked onto large seedlings in glass-house to force growth.
180	Topworked STG plants transferred to hardening off glass-house.
240	Indexing and pre-immunization commences.
330	Pre-immunized material tested for presence of mild isolate.
420	Material declared citrus exocortis and citrus tristeza virus free. Pre-immunized material released to Outspan Foundation Block.
960	First evaluations at Outspan Foundation Block.

STG PROCEDURES

Eight shoot-tips are budded to seedlings in test tubes.

Three successful explants are kept.

Two of these explants are indexed by budding 2 indicator plants with 2 buds per virus to be tested.

If negative these two plants are sent to Nucleus Block (virus free) and daughter plants are made for pre-immunization (PI) from one of these explants (2-10 depending on a priority). A minimum of 2 buds are put on each plant to PI.

ANNEXURE 6

OFB EVALUATION LIST

This is a dBase file with the following information:-

CULTIVAR
SELECTION
CULTIVAR CODE
DATE PLANTED
TREE YIELD]
FRUIT SIZE] (cf. list of norms below)
GENERAL COMMENT]

Details of all annual evaluations are recorded in this file.

Individual tree details for each year are recorded in accordance with the evaluation norms list below.

A printout of the OFB Evaluation List signed by the Evaluation Committee and approved by the Cultivar Committee serves as certification of the OFB orchard trees as Foundation Plants.

Evaluation Norms

Tree Characteristics	Each tree is compared to other trees of the same selection - any abnormalities are noted. Tree size, condition, tree shape and leave shape are checked.
Yield	Yields are taken of individual trees annually.
Fruit Size	Fruit size is estimated annually (per budwood source tree [BST]).
Fruit Shape and texture	Each BST is checked for fruit with chimeras, high shoulders, large/protruding navels, coarse rind texture, elongated shape, creasing, abnormally large oil cells and out of season (OOS) or late set fruit.
Internal Quality	Juice %, TSS, Acid Ratio and seed counts are determined on each scion/rootstock combination.

ANNEXURE 7

S.A. CITRUS SUPERPLANT SCHEME
S.A. SITRUSSUPERPLANTSKEMA

APPLICATION FOR SUPERPLANT TREE LABELS
AANSOEK OM SUPERPLANT BOOM ETIKETTE

NURSERY: DATE:
KWEKERY: ..... DATUM: .....

OFB INVOICE NO. OGB FAKTUUR NR.	CULTIVAR CODE/KODE	ROOTSTOCK ONDERSTAM	QUANTITY HOEVEELHEID	BLOCK NO. BLOK NR.

FOR OFFICE USE ONLY			
JOB NO.	CERTIF-ICATE	DATE	INVOICE NO.

Signed
Geteken: .....

ANNEXURE 8

REFERENCE NO
VERWYSINGSNR _____

S A CITRUS IMPROVEMENT PROGRAMME / S A SITRUSVERBETERINGSKEMA
REGISTER OF NURSERY TREE SALES / REGISTER VAN KWEKERY BOOM VERKOPE

NURSERY
KWEKERY _____

MONTH
MAAND _____

YEAR
JAAR _____

	OFB INV. NO OGB FAKT. NR	CULTIVAR CODE/KODE	ROOTSTOCK ONDERSTAM	QTY TREES HOEV. BOME	BLOCK NO. BLOK NR.	NAME OF GROWER NAAM VAN KWEKER	ADDRESS ADRES

PLEASE SUBMIT ONE COMPLETED FORM EACH MONTH TO CIP SECRETARY, BOX 12154, CENTRAHIL, PORT ELIZABETH 6006
STUUR EEN VOLTOOIDE VORM ELKE MAAND AAN:- CIP SECRETARY, BOX 12154, CENTRAHIL, PORT ELIZABETH 6006

ANNEXURE 9

OFB EVALUATION PROCEDURES

The Evaluation Committee operates as follows:

1. Two horticulturists and one co-opted member comment on tree characteristics, yield and fruit size (in accordance with the evaluation norms in Annexure 6).

2. Two horticulturists and one co-opted member concentrate on fruit shape and texture in accordance with the evaluation norms in Annexure 6.

3. Any branches bearing suspect fruit are removed. If more than the occasional off-type is observed the tree is suspended for that year and it is not used as a budwood source until further evaluations have been carried out.

4. The virologist searches for any signs of CTV, stunting and any other possible virological or pathological problems. Suspect trees are indexed and where a severe strain of CTV is present the trees are removed.

5. All comments are recorded by the Chairman of the Evaluation Committee.

6. Internal quality tests are carried out on all scion/rootstock combinations once they reach 4 years.

ANNEXURE 10

BUDWOOD RELEASES FROM THE ITSC

8. The ITSC cuts material in the CIP Block (see 2.1.5) and OUTSPAN s e nds this material by courier to OFB. Cultivar Development (C D) assists and co-signs the supply form as below. Copies are sent to OFBM and MCIP.

9. The OFB buds seedlings for OFB orchards (2 RL, 2 TC, 2 SC for new releases) and increase blocks, and forwards the adjusted supply form to MCIP.

10. MCIP updates the CIP cultivar status file (SPLIST.dbf) and updates bud take and budwood estimates for each growth period (every month) in conjunction with OFBM.

11. Summaries of 3 are copied to CD and Extension. This report includes a list of commercial selections and all experimental selections available.

CITRUS IMPROVEMENT PROGRAMME
SITRUSVERBETERINGSKEMA

Date/Datum _____

MATERIAL SUPPLIED TO THE OFB
MATERIAAL AAN DIE OGB VERSKAF

Selection/Seleksie	Code/Kode	Qty. buds/ Aantal Ogies

Remarks/Opmerkings: _____

_____

_____

_____ _____

for ITSC for Outspan

ANNEXURE 11

DELIVERY NOTE
AFLEWERINGSNOTA

DATE/DATUM

OUTSPAN FOUNDATION BLOCK
OUTSPAN GRONDVESBLOK
P O Box/Posbus 2945
Uitenhage
6230 SOUTH AFRICA / SUID AFRIKA
Kruisrivier, Uitenhage

Tel: (041) 9925366 (Office/Kantoor)
Fax: (041) 9925366

Vat Regisgration No.
BTW Registrasie Nr.

PROPAGATION MATERIAL SUPPLIED
VOORTPLANTINGSMATERIAAL VERSKAF

Cultivar	Code Kode	Ref. Verw.	Quantity Hoeveelheid	Unit Cost Eenheid Koste	Royalty Tantiem	Amount Bedrag	Material Materiaal	Coment Kommentaar
AMOUNT DUE / BEDRAG VERSKULDIG								

ANNEXURE 12

S A CITRUS IMPROVEMENT PROGRAMME
S A SITRUSVERBETERINGSKEMA

APPLICATION FOR PARTICIPATION
AANSOEK VIR DEELNAME

_____

Date/Datum _____

Kwekery Naam:
Nursery Name: _____

Address/Adres: _____

_____

_____ Tel: _____

Name of Owner/Nurseryman:
Naam van Eienaar/Kwekeryman: _____

Anticipated annual tree production:
Verwagte Jaarlikse boom produksie: _____

Cultivars to be produced (give approximate % if possible)
Cultivars vir beplande produksie (gee beraamde % as dit moontlik is)

Rootstocks to be used (give approximate % if possible)
Onderstamme vir beplande produksie (gee beraamde % as dit moontlik is)

_____

Signed/Geteken

ANNEXURE 13

CITRUS IMPROVEMENT PROGRAMME

TREE SIZE STANDARDS

Until recently the minimum legal requirement for nursery tree size was that the tree had to have formed round, hard wood, at a height of 500 mm before leaving the nursery, with a budding height of at least 200 mm above ground level. As a result of technological advancement, however, the need arose for smaller or shorter trees to be planted in certain areas of South Africa.

The requirement of a minimum budding height of 200 mm has remained unchanged to prevent soil-borne pathogens from penetrating the bud-union. It has been decided, however, to substitute new standards for the 500 mm requirement, in order to provide for the various needs of the growers. Thus growers will be entitled to buy the size of the tree they want and not necessarily trees of one standard size only.

The following tree descriptions have been drafted to categorize the types of tree that are now available.

Cat	Name	Description
1	Mini-tree	A tree showing bud (scion) growth of at least 15 cm.
2	Whip tree	A tree without any scaffold-branches, but with a stem (scion) already hardened off at the intended topping height. Trees may therefore be topped at any height above 15 cm (above the bud-union) to suit the grower's requirements.
3	Scaffold tree	A tree which has formed scaffold branches at a height required by the grower, *with a stem thick enough to support the scaffold.*

It is very important to note that category 1 is a very small tree indeed and will require "nursing" in the orchard. It is advisable therefore to place all orders in writing, stipulating the type and size of tree required. Nurseries and growers are free to stipulate any further standards or finer details in their agreement, eg stem diameter, number of scaffold branches, etc, provided the minimum standard, i.e. the mini-tree, is met, and that the other tree sizes meet the requirements stipulated.

Figure 2 shows the different categories of tree now certifiable.

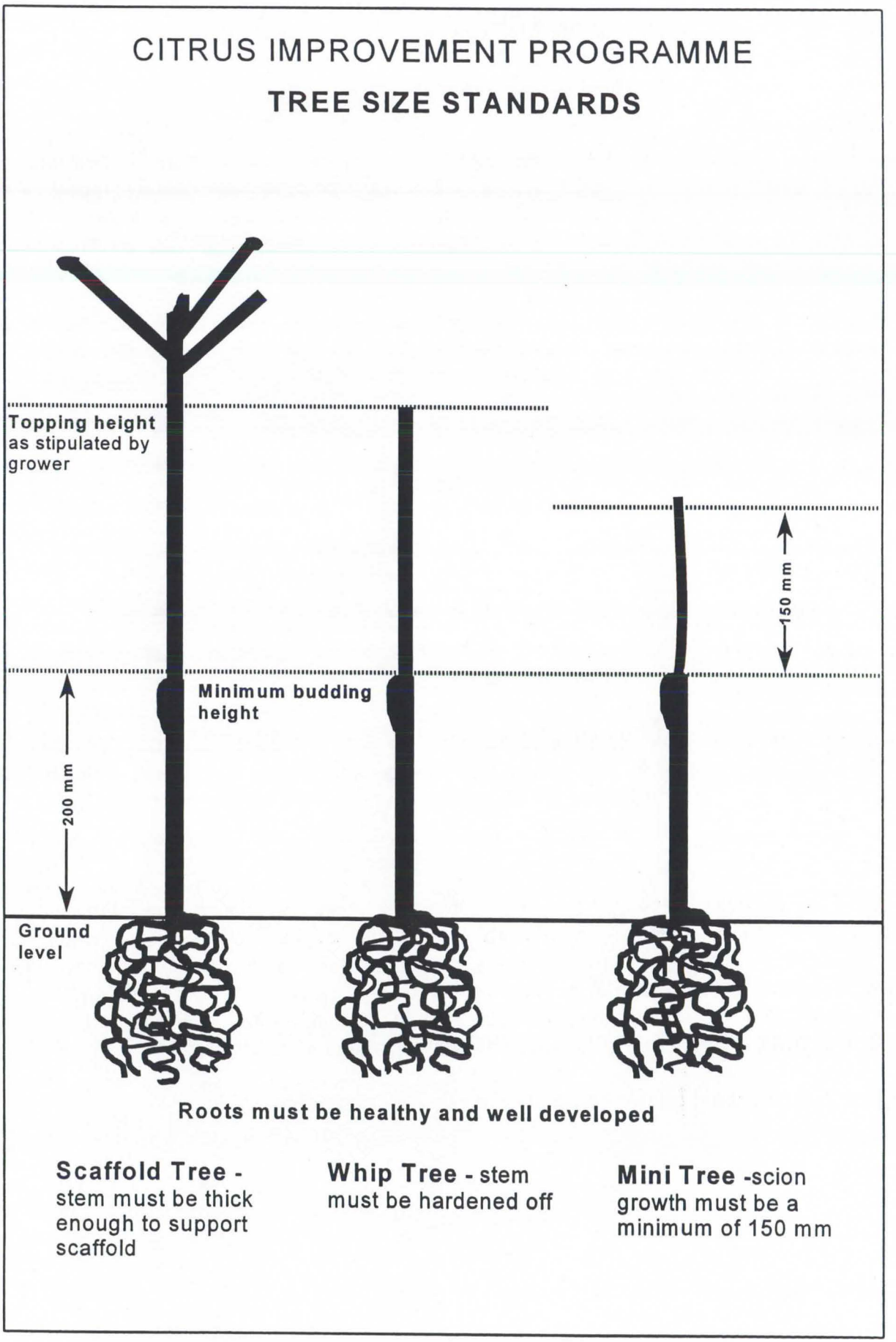


Figure 3: Different categories of citrus nursery trees certifiable

ANNEXURE 14

OUTSPAN FOUNDATION BLOCK - BUDWOOD CUTTING PROCEDURES

DATE

Cultivar								
Source								
Quantity								
Code								
Labelled/Colour								
Time: start/stop								
Date / Cut by								

ANNEXURE 15

OUTSPAN FOUNDATION BLOCK BUDWOOD PROCESSING PROCEDURES

DATE:

Cultivar/Date									
Code									
Quantitiy 1)									
2)									
3)									
4)									
Processed date, Time									
Swept									
Counted, Treated									
Labelled, Colour									
Air dry - time									
Pre-cool - time									
Packed - time									
Checked by									