



Auscitrus

**Australian Citrus Propagation Association
Incorporated**

ANNUAL REPORT

2019

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GOVERNANCE

MISSION STATEMENT

Auscitrus will ensure that adequate supplies of healthy, true to type, and certified citrus propagation material are produced in a scientifically sound, efficient, and economically sustainable manner

AUSCITRUS MEMBER ORGANISATIONS AND DELEGATES

Member organisation	Delegate
Citrus Australia Ltd	David Stevens (grower)
Nursery and Garden Industry NSW & ACT	Gary Eyles (nursery)
Nursery and Garden Industry NSW & ACT	Mark Engall (nursery)
Nursery and Garden Industry Qld	Wayne Parr (nursery)
Nursery and Garden Industry VIC	Sean Arkinstall (nursery)
Queensland Citrus Improvement Scheme	Nick Ulcoq (grower)
South Australian Citrus Improvement Society	Mike Arnold (grower)
South Australian Citrus Improvement Society	Steve Burdette (nursery)
Sunraysia Citrus Growers	Greg Chislett (nursery)
Sunraysia Citrus Growers	Matt Cottrell (grower)
WA Citrus	Anthony Innes (nursery)

AUSCITRUS EXECUTIVE COMMITTEE

Mike Arnold (Chairman)

Wayne Parr (Vice Chairman)

Gary Eyles (Public Officer)

Steve Burdette

Greg Chislett

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CHAIRMAN'S REPORT



Auscitrus has had another successful year.

In March we were hosts to over a hundred citrus growers on the annual Citrus grower's field trip. Our new screen house wasn't quite finished then, but we did hear many favourable comments.

The screen house is now finished and ready to take trees. Delegates will have a chance to look through it at the AGM, and Tim will be able to answer any questions on how we intend to use it.

The management committee is now considering putting up a second screenhouse. This will mean all production of budwood is under screen. This will be a great saving on water and eventually maybe the closing of our outside budwood orchard.

The SA seed orchard at Monash is supplying very good seed fruit and it is worth having more seed trees in case of a disaster such as hail etc. at Dareton. Thank you to Mildura Fruit Company for delivering the fruit to Auscitrus freight free.

This year before the AGM we will be running a workshop on August 6th in Mildura on the future structure of Auscitrus. It will be run by Russell Cummings and will include such things as membership. We hope all delegates can join us for the review and more importantly get involved in the general discussion, it is your future.

We have had another successful year of budwood and seed sales although I wonder how long it can continue with the present restriction on water availability. Large areas of plantings of citrus, vines and almonds currently lease a good quantity of water and at \$600 plus a megalitre for the temporary access - there comes a time when this will be unviable.

We have an excellent team working for Auscitrus, Nerida at EMAI and Tim at Coomealla, which all helps in making Auscitrus the success that it is. Thank you to both teams.

I must thank the management teams that put their time into Auscitrus. They are all busy in their own businesses but are all able to help out in the running of our organization.

Mike Arnold A.F.S.M.

Chairman of Auscitrus

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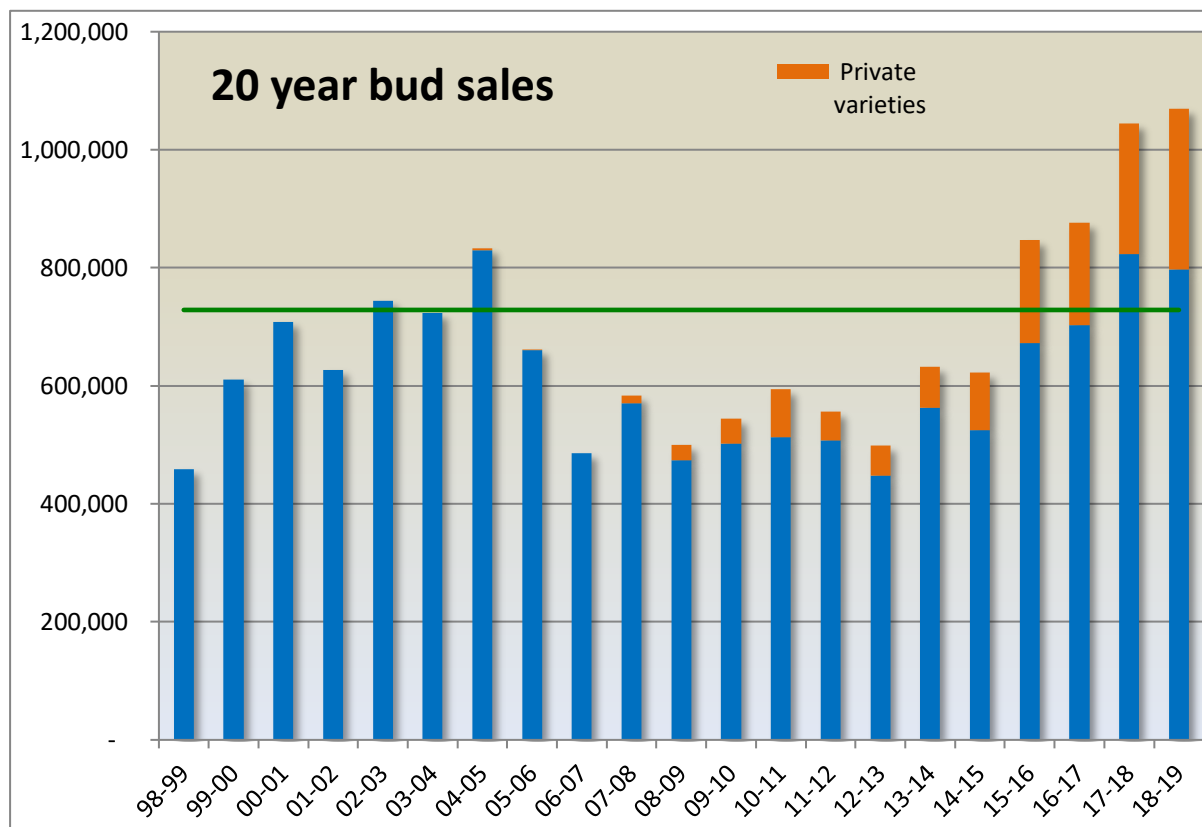
BUDWOOD SCHEME

Bud sales totalled 1,069,185 buds, slightly higher than 2017/18 record sales of 1,067,729, again surpassing the 1 million bud milestone. Of these, 797,246 buds were of public varieties, and 271,937 buds (25% of the total) were private varieties. Top selling public varieties were:

Variety	Buds sold
Cara Cara	84,615
Washington	73,431
Eureka Taylor 3402	65,900
Lane late navel	46,055
W Murcott Afourer	45,991
Tahiti lime	44,855
Salustiana	39,387
Imperial mandarin	35,670
Murcott	32,845
Meyer lemon	30,045
Benyenda Valencia	23,795
Midnight Valencia	21,880

Note that all of these top public varieties come from field budwood trees, while the majority of private bud sales are from nursery rapid multiplication trees.

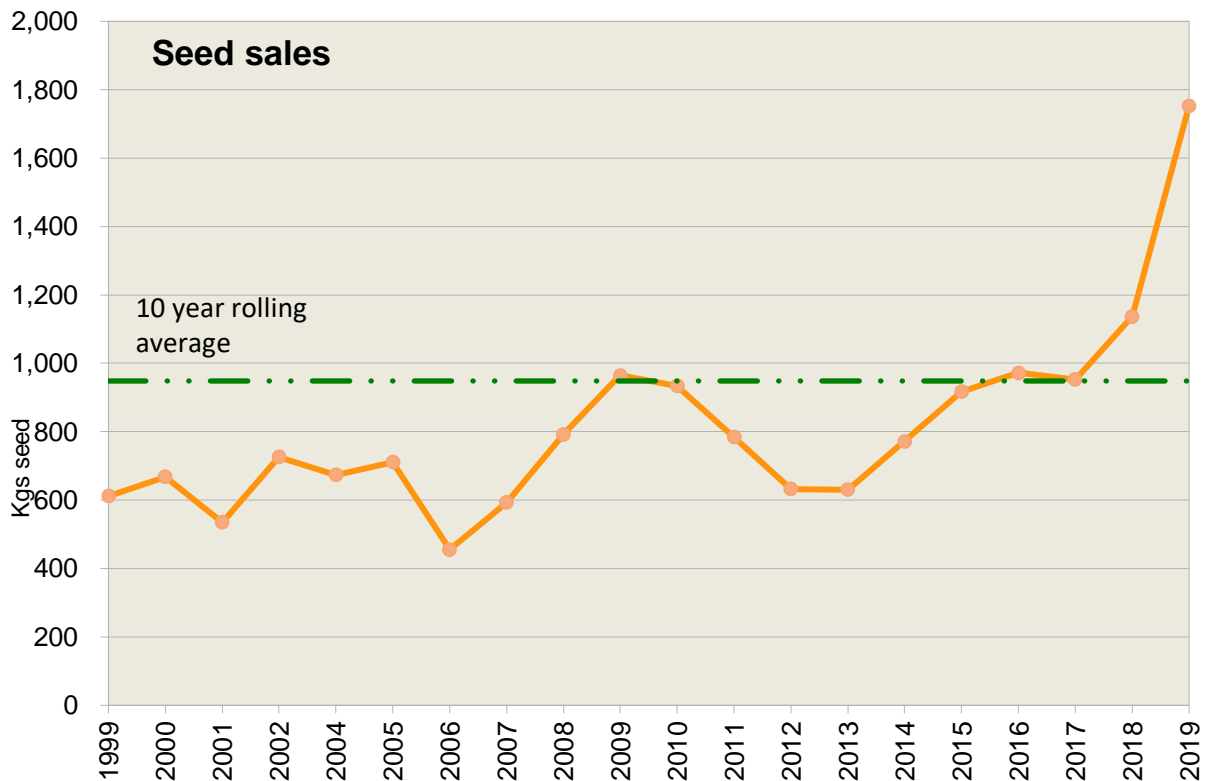
The trend continues upwards:



Auscitrus field staff have worked hard to stay on top of bud cutting and production and have done a great job keeping up with the demand.

SEED SCHEME

Seed sales for the 2018/19 year ended up at 1,752.8kgs, smashing last year's record sales of 1,137kgs.



This total includes 251kg of export sales across 14 different international customers in New Zealand, South Africa, Chile, South Korea.

Domestic sales were 1501kgs, so even without the exports seed sales were far in excess of previous year's sales, at around 160% of the 10 year average.

Sales of P trifoliata, Carrizo and Troyer dominated sales as usual. Tri sales were significantly higher than normal, indicating new plantings into areas of heavier soils. The new NSW DPI rootstock Zao yang, which in NSW DPI trials is a better performing tri type, is also increasing in demand.

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Seed variety	Kgs sold
Benton	32.7
C35	139.3
Carrizo	503.7
Cleopatra	12.3
Cox hybrid	38.7
Flying dragon	138.5
P trifoliata	457.0
Rangpur lime	3.1
Rough lemon	11.6
Others	3.5
Sour orange	3.0
Sweet orange	1.5
Swingle	28.8
Troyer	319.7
Volkameriana	21.9
West indian lime	0.5
Donghai	0.1
Ghana	0.2
Zao yang	35.2
Macrophylla	0.5
Tanghe	1.2
Grand total	1,752.8

Benton was again in short supply, but yields are increasing with the first harvest of top-worked trees this year. Carrizo and Troyer sold out as South Africa took all we had left over from domestic orders.

Seed orders for 2019/20 are at 963kgs, with 439kg already having left the cool room at the time of writing. We have harvested around 2300kgs of seed and harvest is almost complete, all varieties will be in surplus apart from Benton.

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CAPITAL WORKS

2018/19 has kept us very busy managing the construction of the new budwood screenhouse and associated infrastructure upgrades. This structure is now completed, sealed up and ready to receive trees in spring.

The existing rapid multiplication trees in the shadehouse are mostly due for retirement so will not be shifted into the new structure, instead staying in the shadehouse for 1 or 2 more years before being discarded. Most trees going into the new structure will be from the propagation house, all going into 7L hydroponic pots.

To summarise the new development we now have:

- 2500 square metres of insect screened production area (in addition to the older propagation house and foundation house).
- New production area is climate controlled with forced air pad/fan cooling, twin skin poly roof and walls.
- All houses are linked with an insect screened plastic roofed atrium, meaning once staff are inside the complex they do not need to go through insect locks to get to individual growing areas.
- Positive pressure insect locks are at the main pedestrian entrance and goods receipt entrance.
- 110kVA auto-start backup generator to power the entire site (on standby)
- Storage for 100kL treated water, 100kL rainwater, and 100kL untreated water

This structure has the capacity to produce around 1M buds per year. The design has allowed for a second stage development to replace the shade house once it is empty, expanding this to 5,000m² and 2M buds per year.

The development has been levy funded through a Hort Innovation project, with Auscitrus contributing funds for upgrades and additional costs along the way.



AUSCITRUS OPERATIONS AT EMAI



Citrus is affected by a number of graft-transmissible organisms, which can be spread through propagation of infected material or via sap on cutting tools. Some organisms cause serious disease or death whilst others induce only mild symptoms. There is no cure for graft-transmissible diseases therefore it is important to prevent orchard infections by using tested propagation material. The Auscitrus source trees are routinely tested for graft-transmissible diseases. Independent testing is provided by the NSW Department of Primary Industries (NSW DPI) at the Elizabeth Macarthur Agricultural Institute (EMAI) located on the outskirts of south western Sydney. At EMAI there are quarantine laboratories and a nursery that are certified under ISO 9001.

Auscitrus is involved in 2 main areas at EMAI:

- National Citrus Repository
- Disease testing of budwood and rootstock seed supply trees.

The following report covers activities during the 2018/19 financial year.

NATIONAL CITRUS REPOSITORY

The 'National Citrus Repository for High Health Status Clones' currently holds 242 citrus accessions with at least 1 tree of each variety held in screen houses in 2 locations; the Auscitrus property at Dareton (in the Sunraysia citrus growing region) and at EMAI (not in a citrus growing region). The repository contains both public (123) and private (119) citrus varieties from imported and local sources.

The 'National Citrus Repository for Inoculated Clones' is housed in a controlled environment green house at EMAI. This repository contains citrus clones that have been inoculated with a mild strain of *Citrus tristeza virus* (CTV). The mild strain serves to protect against more severe strains of the virus that may be introduced to trees in the field by aphids – this control mechanism is called mild strain cross protection.

Before a new variety enters the repository system, a foundation tree is propagated and rigorously tested for graft-transmissible pathogens including citrus viroids, CTV, *Citrus psorosis virus* (CPSV), *Citrus leaf blotch virus* (CLBV) and *Citrus tatterleaf virus* (CTLV). A range of biological, serological and molecular methods are used to check the health status of the tree. If a pathogen is detected it must be eliminated by shoot tip grafting before a variety is allowed to enter the repository system. This ensures the high health status of trees held in the National Citrus Repositories. Imported varieties are tested and undergo pathogen elimination in post-entry quarantine run by the Australian Government Department of Agriculture. Auscitrus provides the service of pathogen testing and elimination by shoot tip grafting for new varieties selected in Australia.

During the 2018/19 year, 6 Australian selections (1 public and 5 privately owned), and 4 imported, privately owned varieties entered the repository program.

After entering the repository system, foundation trees are re-tested for graft-transmissible pathogens according to a designated schedule. Trees are tested annually for CTV but are not tested every year for those pathogens not transmitted by insect vectors. This is because the risk of infection with non-vectored pathogens is low for trees managed under strict biosecurity protocols in the repository.

The maintenance and testing of public varieties is funded by Hort Innovation and Auscitrus and for private varieties is paid for by the variety owner.

It is important to note that the *high health* status of repository trees means that no viruses or viroids have been detected in these trees using current test methods. These trees have a *high health status* but pathogens may be detected in these trees through improved test methods and the discovery of new pathogens.

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TESTING FOR CITRUS DISEASES

CTV is graft-transmissible and can be spread by aphids. The repository houses are screened to exclude aphids but every tree in the repository is tested annually for CTV using a serological test called a direct tissue blot immunoassay (DTBIA). This test is used to confirm that the virus is not present in the high health status clones and to confirm that the virus is present in the inoculated trees.

Trees in the EMAI screen house repositories were tested for CTV in autumn 2019. No CTV was detected.

All inoculated repository trees tested positive for CTV in autumn 2019. Budwood is only sourced from inoculated trees that test positive for CTV during their last test.

Repository trees were tested for other graft-transmissible diseases (huanglongbing, viroids, *Citrus leaf blotch virus*, *Citrus tatterleaf virus*) during 2018-19 if they had not been tested previously using a molecular assay.

Rootstock seed supply trees are scheduled for testing every 9-12 years for *Citrus leaf blotch virus* using molecular techniques. Samples from 657 rootstock seed supply trees were tested during 2018-19 with no pathogen detected.

Viroid testing (*Citrus exocortis* viroid and Hop stunt viroid) was completed for 269 Auscitrus rootstock seed supply trees during the 18/19 year. This is not part of the regular indexing schedule but was undertaken to inform management practices on site.

PATHOGEN ELIMINATION

Viruses and viroids can be removed from infected mother trees by shoot tip grafting. Successful shoot tip grafted plants then require testing to determine if the pathogens have been eliminated. Auscitrus provides the service of pathogen testing and elimination for Australian citrus selections.

At the end of the 18/19 year, 7 varieties are currently in the variety testing program for Australian selections. All of these varieties are undergoing pathogen elimination by shoot tip grafting. Pathogens were successfully eliminated by shoot tip grafting from 5 private varieties and 1 public variety during the 2018/19 year.

RESEARCH AND DEVELOPMENT

The high health status of the Australian citrus industry is largely dependent upon accurate testing of propagation material for viruses and viroids which can cause graft-transmissible diseases. NSW DPI and Auscitrus are working together on an industry funded project supported by Hort Innovation to find better methods for screening citrus plant material. The current project (CT17007) started in November 2018 and will run until September 2022. Improvements to current protocols were identified through the previous project (CT14009), continue to be identified in the current project, and are adopted by Auscitrus where relevant.

TEAM MEMBERS

NSW DPI

Wendy Forbes	Auscitrus Indexing Officer (0.4 FTE)
Adrian Dando	Auscitrus Indexing Officer (0.6 FTE) from 1.4.19
Grant Chambers	Technical Advisor
Anna Englezou	Technical Advisor
Nerida Donovan	Citrus Pathologist

Independent

George Haizer	Nursery Contractor (casual)
Vipawee Iamsa-at (Noi)	Nursery Contractor (casual)

APPENDIX 1: CLONES OF PUBLIC VARIETIES IN THE 'NATIONAL CITRUS REPOSITORY FOR HIGH HEALTH STATUS CLONES'

as of June 2019

Accession number	Citrus clone
Grapefruit	
I.N.91.0736	Flame
I.N.89.0620	Henderson
A.N.73.0068	Marsh (3970 Druitt)
A.N.91.0632	Marsh (3962 Druitt)
I.N.89.0619	Ray Ruby
I.N.89.0708	Rio Red
I.N.89.0709	Star Ruby
A.N.04.0950	Star Ruby (Cant)
A.N.91.0633	Thompson (N Eagle)
Pumelo	
A.Q.19.1061	K15
I.N.01.0925	Namroi
I.N.94.0786	Tambun
Citron	
I.N.01.0926	Bergamia Bergamot Castagnaro
I.N.94.0904	Buddha's Hand
I.N.09.0979	Etrog
Lemon	
I.N.01.0927	Eureka (Allen)
A.N.75.0034	Eureka (Lambert)
A.N.75.0035	Eureka (Taylor)
I.N.89.0703	Fino
A.Q.93.0785	Lemonade
I.N.00.0918	Lisbon (Limoneira 8A)
I.N.75.0036	Lisbon (Prior)
A.Q.91.0631	Lisbon (Queensland)
A.NT.15.1032	Tropical Meyer
I.N.89.0705	Verna
Lime	
A.N.08.0969	Tahiti lime
A.N.90.0771	West Indian lime (Schweppes)
Orange	
<i>Navel</i>	
I.N.86.0600	Atwood
A.Q.78.4021	Benyenda - thorny
A.N.14.0993	Cara cara new
I.N.86.0597	Fisher
I.N.99.0912	Fukumoto
A.S.75.5077	Hockney
A.N.73.0073	Houghton
A.S.92.0772	Hutton
A.N.75.0032	Lanes Late 3976
A.N.73.0072	Leng
A.V.94.0781	Lloyd/3 Leng
I.N.86.0550	Navelate
I.N.87.0546	Navelina Spain 7.5
I.N.93.0899	Navelina 315 ex Italy
A.S.92.0773	Neilson
I.N.86.0598	Newhall California
I.N.87.0551	Newhall 55-1 Spanish
I.N.10.0984	Palmer 1051
A.S.75.5074	Thomson
<i>Valencia</i>	
A.S.75.5095	B/3010
A.Q.75.4022	Benyenda
A.S.94.0782	Berri 3501
A.V.94.0780	CSIRO 5
A.V.93.0774	Jenner 4439
A.N.75.0029	Newton – Keenan 3125
A.N.75.0030	Newton – Keenan 3247
Accession number	Citrus clone

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<i>Other oranges</i>	
I.N.92.0901	Lima 156 (acidless)
A.S.10.0985	Blood orange (Arnold)
I.N.98.0921	Blood orange (Sanguine)
I.N.08.0968	Blood orange (Tarocco Ippolito)
I.N.07.0965	Blood orange (Tarocco Meli C8158)
I.N.07.0966	Blood orange (Tarocco Rosso C4977)
I.N.06.0960	Common orange (Bintangcheng # 2)
I.N.08.0973	Common orange (Bintangcheng Renbin # 5)
I.N.94.0902	Common orange (Delta seedless)
I.N.86.0548	Common orange (Hamlin)
I.N.02.0930	Common orange (Jaffa)
I.N.06.0959	Common orange (Jincheng 447)
I.N.94.0903	Common orange (Midnight)
I.N.92.0900	Common orange (Natal)
I.N.86.0549	Common orange (Parson Brown)
I.N.90.0741	Common orange (Pera Olympia)
I.N.90.0742	Common orange (Pera Limeira)
I.N.87.0547	Common orange (Pineapple)
I.N.93.0860	Common orange (Salustiana)
A.Q.78.4020	Common orange (Smith - Joppa)
I.N.97.0924	Pigmented navel (Cara Cara)
A.S.17.1043	Poorman's Orange
Mandarin	
I.N.99.0909	Afourer
I.N.99.0913	Avana Tardivo
I.N.99.0914	Avana Apireno
I.N.98.0920	Clementine (Caffin)
I.N.89.0704	Clementine (Clementard)
I.N.99.0910	Clementine (Corsica 1)
I.N.99.0911	Clementine (Corsica 2)
I.N.87.0544	Clementine (Fina)
I.N.87.0552	Clementine (Marisol)
I.N.05.0957	Clementine (Nour)
I.N.87.0543	Clementine (Nules)
I.N.04.0955	Clementine (Orogrande)
I.N.87.0545	Clementine (Oroval)
I.N.04.0953	Clementine (Sidi Aissa)
I.N.91.0733	Daisy
I.N.90.0736	Encore
I.N.08.0974	Etna
I.N.89.0707	Fallglo (VI 484)
I.N.90.0695	Fallglo (S-837-4-2)
I.N.93.0859	Fortune
A.Q.94.0787	Fremont
A.N.75.0041	Hickson
A.N.75.0043	Imperial 0043/2
A.Q.94.0778	Nova (Trott)
I.N.91.0734	Nova (Spain)
I.N.04.0951	Parsons Special /2
I.N.86.0599	Pixie
I.N.04.0954	Primosole
A.N.75.0065	Satsuma (Silverhill)
I.N.89.0706	Satsuma (Clausellina)
I.N.91.0852	Satsuma (Okitsu Wase)
I.N.91.0853	Satsuma (Miho Wase)
A.Q.94.0886	Sunburst
A.NT.15.1034	Tropical Emperor
Tangor/elo	
A.N.75.0090	Ellendale (Herps)
	Ellendale / EM3
A.Q.04.0952	Murcott tangor (Benham)
A.Q.90.4149	Murcott tangor (Turner)
I.N.90.0818	Topaz tangor

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Accession number	Citrus clone
Papeda	
I.N.94.0776	Kaffir lime (Malaysia 4669)
A.D.97.0907	Kaffir lime (Nathanael)
I.N.00.0916	Kaffir lime (Eyles)
I.N.15.1020	Sudachi
A.N.13.0991	Yuzu
Kumquat	
A.N.15.1033	Calamondin
I.N.04.0956	Nagami
Rootstock	
A.N.18.1054	Benton citrange