Australian Citrus Propagation Association Incorporated

ANNUAL REPORT

2022

CONTENTS

GOVERNANCE

OUR VISION

To be an integral component of Australia's citrus industry biosecurity through the provision of citrus propagation material produced according to world's best practice.

OUR MISSION

Auscitrus will protect the Australian citrus industry by ensuring that adequate high health and true to type citrus propagation material is produced in a scientifically sound, efficient, and 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	Steve Burdette (grower)
South Australian Citrus Improvement Society	David Arnold (grower)
South Australian Citrus Improvement Society	*Vacant (nursery)*
Sunraysia Citrus Growers	Greg Chislett (nursery)
Sunraysia Citrus Growers	Matthew Cottrell (grower)
WA Citrus	Anthony Innes (nursery)

AUSCITRUS EXECUTIVE COMMITTEE

Gary Eyles (Chairman & Public Officer)

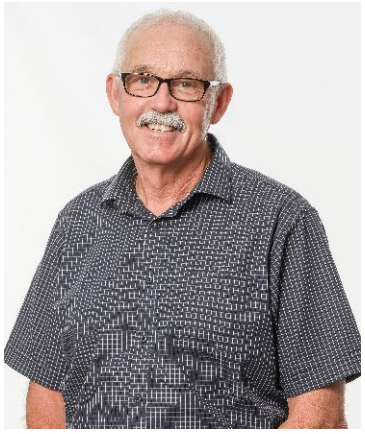
Wayne Parr (Vice Chairman)

David Arnold

Steve Burdette

Greg Chislett

CHAIRMAN'S REPORT



This is my first Chairmans Report for Auscitrus in many years. I must thank Mike Arnold for his time, commitment and guidance of Auscitrus. It's a tribute to his leadership that Auscitrus has become a world class supplier of propagation material for Australia's Citrus Industry.

Our challenge now is to build on this legacy and continue to improve the operation. We need to be able to withstand industry cycles, be resilient in the face of various threats especially Biosecurity threats and always remain relevant to the citrus and nursery industries.

The Executive Committee has now returned to face-to-face meetings. In February we renewed the Strategic plan giving some specific attention to succession and governance. We continue to seek opportunities to increase industry representation with the aim at increasing our delegate base. Keeping equal representation between growers and nursery people must be maintained at all times.

The second stage of the insect proof greenhouse development is now well underway. Once finished it will provide the ability to completely supply clean budwood if Australia has an incursion of the Asian Citrus Psyllid or similar pest.

In the interest of continued improvement Tim Herrmann will be attending the upcoming ISCN congress in California. Amongst other visits he will inspect the core of Californian budwood at the UCR research facility along with the Lindcove operation in the heart of Californian citrus. These visits along with networking with other world class budwood schemes will help keep Auscitrus a world class operation.

Auscitrus is fortunate to have such a high level of commitment from its staff both directly employed at Dareton and the roles it supports at EMAI. I would like to personally thank Tim, Mandy, Robert, Margaret, Logan and Sierra at Dareton and Nerida, Wendy and Adrian at EMAI. Their commitment and hard work is behind the success of Auscitrus.

I also want to personally thank Greg Chislett for his time on the Executive Committee. His quiet consideration and council has been of great assistance to the survival and growth of Auscitrus. Greg is retiring from Auscitrus at the upcoming AGM.

Gary Eyles

Auscitrus Chairman

BUDWOOD SCHEME

Total buds shipped for the 2021/22 season was **1,242,001**.

This is slightly above the previous all-time high of 1,217,753 in 2020/21.

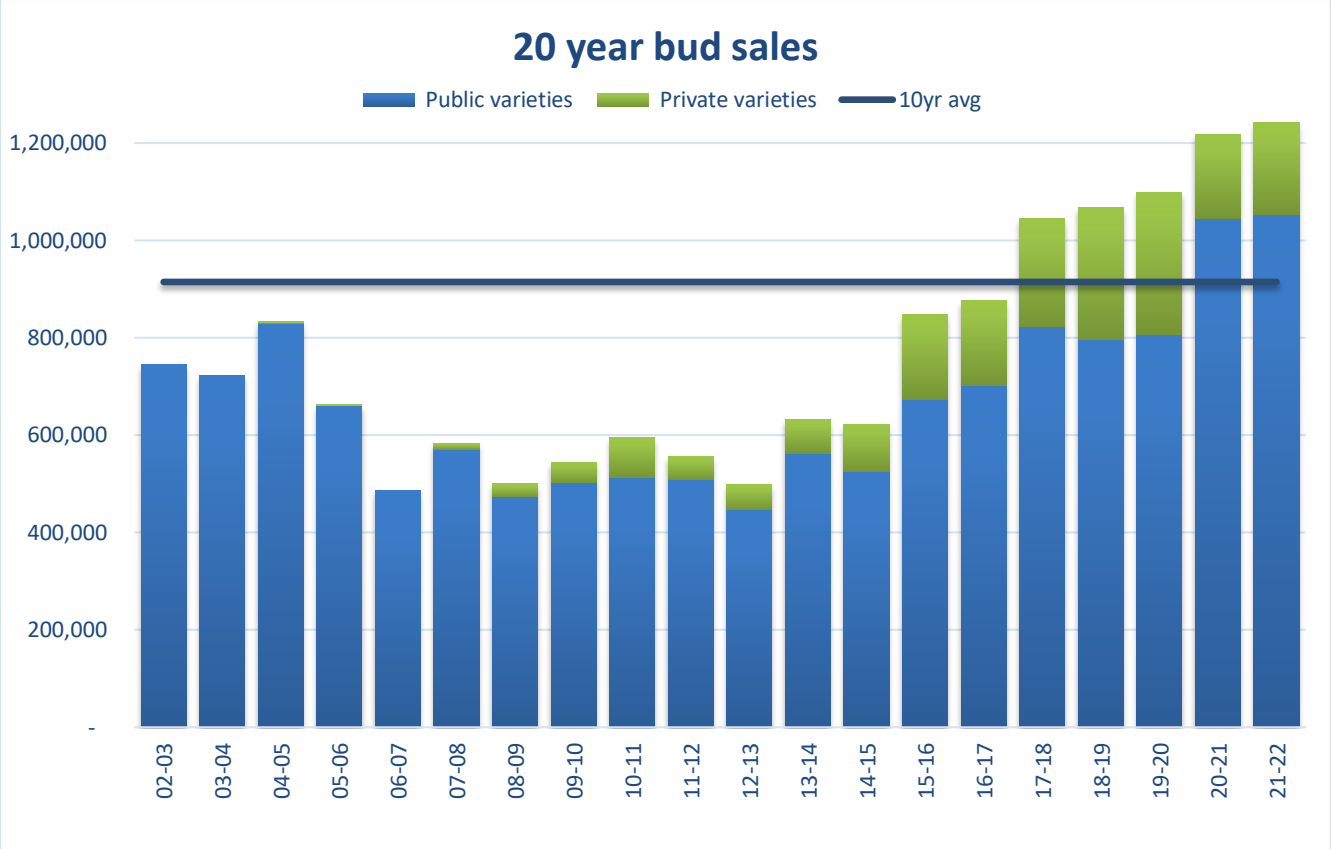
Of this total 188,555 buds were of private varieties.

Public varieties that sold more than 10,000 buds for 2021/22 season as follows:

Variety	Bud sold
Washington Navel	114,430
Lane Late Navel	105,075
Afourer	88,565
Cara Cara Navel	82,515
Fisher Navel	53,690
Lime Tahiti	52,635
Lemon Eureka Taylor	52,559
Imperial Mandarin	43,205
Salustiana	38,350
Meyer (806) Lemon	34,570
Keenan Valencia	27,910
Emperor Mandarin	27,515
Navel Navelina (7.5 Spain)	26,200
Kaffir Eyles Lime	22,420
Midknight Valencia Seedless	20,640
Grapefruit Star Ruby (Calif)	17,225
Lemonade	14,785
Arnold Orange Blood	14,510
Murcott Mandarin	13,380
Lemon Lisbon (Prior)	13,027
McMahon Valencia Seedless	12,837
Okitsu Satsuma	12,565

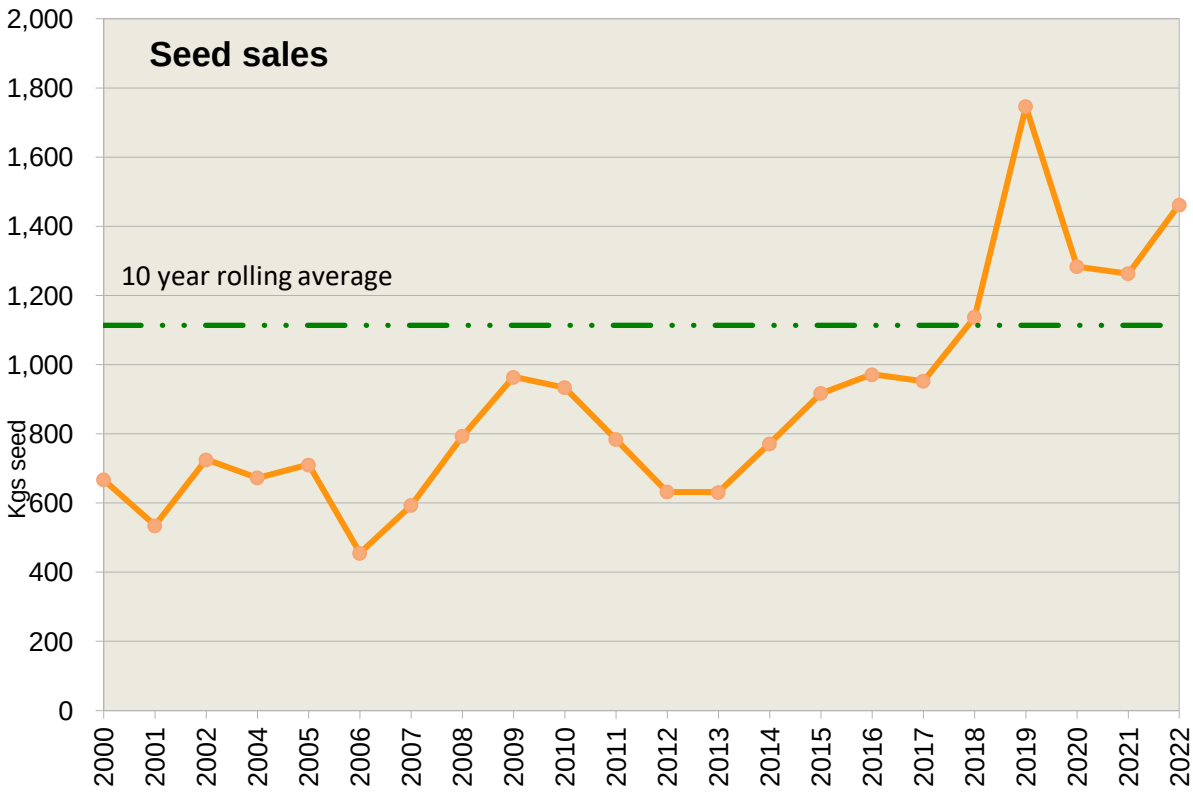
The majority of the Fisher buds came from partially indexed trees on a private grower's orchard. Nurseries are required to sign an agreement acknowledging the status of these buds supplied as partially indexed and are advised to inform the grower purchasing the trees.

25,000 of the Cara Cara buds came from fully indexed orchard trees on the Dareton DPI research station.



SEED SCHEME

Seed sales for the year came to **1,462kg**, up from last season and still following a generally upward trend.



Highest seller was Carrizo as has been the trend in recent years.

Rootstock	Kgs supplied
Carrizo Citrange	447.7
Poncirus trifoliata	284.9
Troyer Citrange	238.2
Flying Dragon	139.9
C35	107.6
Swingle Citrumelo	63.3
Cox Mandarin Hybrid	44.8
Zao Yang	41.1
Benton Citrange	27.3
Cleopatra Mandarin	26.8
Rough Lemon	22.6
Volkameriana	5.0
Sour Orange	5.0
Rangpur Lime	3.2
Barkley	2
C22	1.2
Anjiang hongju	0.8
Sweet Orange	0.8
Tanghe	0.1
Ghana	0
West Indian Lime seed	0.1
Grand Total	**1,462**

This amount includes export sales which totalled 108kg, the majority of which was sent to New Zealand. A similar amount is exported to NZ most years.

The rootstocks C22 and Barkley are relatively new to the seed scheme and will be made available commercially in the 2022/23 season, with higher yields expected in 2023.

SCREENHOUSE EXPANSION

The existing budwood screenhouse is nearing capacity, currently holding around 18,000 trees in 7L Plantlogic pots (capacity is around 25,000). These trees are capable of producing around 450,000 buds per cut, or 900,000 per year across two cuts.

As part of our forward preparation for any insect transmissible disease incursion, we are progressing with stage II of this development already. Stage II is a mirror image of the existing Stage I budwood house – approx. 2500 square meters, twin-skin poly, pad/fan cooling.

As of the time of writing stage II is mostly framed up, electricians are busy running cable, and the installer is scheduled to return in a few weeks to complete skinning the building and install the cooling system.

Auscitrus staff will then install the irrigation and drainage systems and lay the plastic/weedmat floors ready to receive trees.

Note that we are still maintaining our field budwood orchard, which we will continue to do until there is an exotic disease/pest incursion in our area. At present we are still indexing these trees routinely and running a nutrition and pruning program for budwood production, under the assumption that we can continue harvesting buds from these trees. If and when we get an incursion in the area (hopefully never) these trees will be removed, and all bud production will shift to the screenhouses.

AUSCITRUS OPERATIONS AT EMAI

Citrus is affected by several graft-transmissible diseases; the causal agents (pathogens) can be spread through propagation of infected material or via sap on cutting tools. Some pathogens 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 propagating new citrus trees using propagation material sourced from health-tested trees. 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 complex. Auscitrus is involved in 2 main areas at EMAI:

- National Citrus Repository Program;
- disease testing of budwood and rootstock seed supply trees.

The following report covers activities during the 2021/22 financial year.

NATIONAL CITRUS REPOSITORY

The 'National Citrus Repository for High Health Status Clones' currently holds (265) 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 (124) and private (141) 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 citrus pathogens. 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 can 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, Fisheries and Forestry. Auscitrus provides the service of pathogen testing and elimination by shoot tip grafting for new varieties selected in Australia.

During the 2021/22 year, five Australian selections and five imported varieties entered the repository program, all privately owned.

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 trees of publicly owned 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.

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.

High health status trees in the Dareton and EMAI repository screenhouses were tested for CTV in autumn 2022. No CTV was detected.

Inoculated repository trees tested positive for CTV in autumn 2022. Some trees were weakly positive but viral particles were still detected. Budwood is only sourced from inoculated trees that test positive for CTV during their last test. Recently inoculateADd trees (7) where CTV was not detected will be re-inoculated in spring 2022.

Testing for pathogenic viroids was completed for 734 Auscitrus and 386 non-Auscitrus budwood supply trees during the year. Auscitrus budwood supply trees (44) were tested for graft-transmissible viruses (apple stem grooving virus, citrus psorosis virus, citrus leaf blotch virus, citrus virus A and citrus concave gum associated virus) to meet export requirements.

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.

During the 2021/22 year, 16 varieties were processed as part of the variety testing program for Australian selections, with pathogen elimination required for 13 of these varieties. Five selections were released from the Australian variety testing program and entered the National Citrus Repository Program during the 2021/22 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 with further funding sought for the program to continue. 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

Nerida Donovan	Citrus Pathologist
Adrian Dando	Auscitrus Indexing Officer (0.6 FTE)
Wendy Forbes	Auscitrus Indexing Officer (0.4 FTE)
Grant Chambers	Technical Advisor
Anna Englezou	Technical Advisor
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 2022

Accession No.	Variety	Accession No.	Variety
Grapefruit		I.N.87.0551	Newhall 55-1 Spanish
I.N.91.0736	Flame	I.N.10.0984	Palmer 1051
I.N.89.0620	Henderson	I.N.86.0549	Parson Brown
A.N.73.0068	Marsh (3970 Druitt)	I.N.90.0739	Pera Bianchi
A.N.91.0632	Marsh (3962 Druitt)	I.N.90.0741	Pera Olympia
I.N.89.0619	Ray Ruby	I.N.90.0742	Pera Limeira
I.N.89.0708	Rio Red	I.N.87.0547	Pineapple
I.N.89.0709	Star Ruby	A.S.17.1043	Poorman's orange
A.N.04.0950	Star Ruby (Cant)	I.N.93.0860	Salustiana
A.N.91.0633	Thompson (N Eagle)	I.N.98.0921	Sanguine
Pomelo		A.Q.78.4020	Smith - Joppa
A.Q.19.1061	K15	I.N.08.0968	Tarocco Ippolito
I.N.01.0925	Namroi	I.N.07.0965	Tarocco Meli C8158
I.N.94.0786	Tambun	I.N.07.0966	Tarocco Rosso C4977
Citron		A.S.75.5074	Thomson
I.N.01.0926	Bergamot Castagnaro	**Mandarin and hybrids**	
I.N.94.0904	Buddha's Hand	I.N.99.0909	Afourer
I.N.09.0979	Etrog	I.N.99.0913	Avana Tardivo
Lemon		I.N.99.0914	Avana Apireno
I.N.01.0927	Eureka (Allen)	I.N.98.0920	Clementine (Caffin)
A.N.75.0034	Eureka (Lambert)	I.N.89.0704	Clementine (Clementard)
A.N.75.0035	Eureka (Taylor)	I.N.99.0910	Clementine (Corsica 1)
I.N.89.0703	Fino	I.N.99.0911	Clementine (Corsica 2)
A.Q.93.0785	Lemonade	I.N.87.0544	Clementine (Fina)
I.N.00.0918	Lisbon (Limoneira 8A)	I.N.87.0552	Clementine (Marisol)
I.N.75.0036	Lisbon (Prior)	I.N.05.0957	Clementine (Nour)
A.Q.91.0631	Lisbon (Queensland)	I.N.87.0543	Clementine (Nules)
A.NT.15.1032	Tropical Meyer	I.N.04.0955	Clementine (Orogrande)
I.N.89.0705	Verna	I.N.87.0545	Clementine (Oroval)
Lime		I.N.04.0953	Clementine (Sidi Aissa)
A.N.08.0969	Tahiti lime	I.N.91.0733	Daisy
A.N.90.0771	West Indian lime (Schweppes)	A.N.75.0090	Ellendale (Herps)
Orange			Ellendale / EM3
A.S.10.0985	Arnold blood	I.N.90.0736	Encore
I.N.86.0600	Atwood	I.N.08.0974	Etna
A.S.75.5095	B/3010	I.N.89.0707	Fallglo (VI 484)
A.Q.75.4022	Benyenda	I.N.90.0695	Fallglo (S-837-4-2)
A.Q.78.4021	Benyenda – thorny	I.N.93.0859	Fortune
A.S.94.0782	Berri 3501	A.Q.94.0787	Fremont
I.N.06.0960	Bintangcheng # 2	A.N.75.0041	Hickson
I.N.08.0973	Bintangcheng Renbin # 5	A.N.75.0043	Imperial 0043/2
I.N.97.0924	Pigmented navel (Cara Cara)	A.Q.04.0952	Murcott tangor (Benham)
A.N.14.0993	Cara cara new	A.Q.90.4149	Murcott tangor (Turner)
A.V.94.0780	CSIRO 5	A.Q.94.0778	Nova (Trott)
I.N.94.0902	Delta seedless	I.N.91.0734	Nova (Spain)
I.N.86.0597	Fisher	I.N.04.0951	Parsons Special /2
I.N.99.0912	Fukumoto	I.N.86.0599	Pixie

I.N.86.0548	Hamlin	I.N.04.0954	Primosole
A.S.75.5077	Hockney	A.N.75.0065	Satsuma (Silverhill)
A.N.73.0073	Houghton	I.N.89.0706	Satsuma (Clausellina)
A.S.92.0772	Hutton	I.N.91.0852	Satsuma (Okitsu Wase)
I.N.02.0930	Jaffa	I.N.91.0853	Satsuma (Miho Wase)
I.N.06.0959	Jincheng 447	I.N.20.1068	Shiranui
A.V.93.0774	Jenner 4439	A.Q.94.0886	Sunburst
A.N.75.0032	Lanes Late 3976	I.N.90.0818	Topaz tangor
A.N.73.0072	Leng	A.NT.15.1034	Tropical Emperor
I.N.92.0901	Lima 156 (acidless orange)	**Papeda**	
A.V.94.0781	Lloyd/3 Leng	I.N.94.0776	Kaffir lime (Malaysia 4669)
I.N.94.0903	Midknight	A.D.97.0907	Kaffir lime (Nathanael)
I.N.92.0900	Natal	I.N.00.0916	Kaffir lime (Eyles)
I.N.86.0550	Navelate	I.N.15.1020	Sudachi
I.N.87.0546	Navelina Spain 7.5	A.N.13.0991	Yuzu
I.N.93.0899	Navelina 315 ex Italy	**Kumquat**	
A.S.92.0773	Neilson	A.N.15.1033	Calamondin
A.N.75.0029	Newton – Keenan 3125	I.N.04.0956	Nagami
A.N.75.0030	Newton – Keenan 3247	**Rootstock**	
I.N.86.0598	Newhall California	A.N.18.1054	Benton citrange