



# Auscitrus

**Australian Citrus Propagation Association  
Incorporated**

**ANNUAL REPORT**

**2013**

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# AUSCITRUS ANNUAL REPORT 2013

## CONTENTS

Chairman's Report .....	1
Manager's report.....	2
Bud Sales.....	3
Seed sales .....	4
Auscitrus operations at EMAI .....	5
Citrus Foundation Repository .....	5
Health status testing for citrus pathogens .....	6
General business.....	7

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# AUSCITRUS ANNUAL REPORT 2013

## CHAIRMAN'S REPORT



It is great to see the Australian dollar falling against the U.S. dollar. This hopefully will mean a greater demand for Aussie citrus at a better price. After a number of years of high dollar and water restrictions there is a better outlook for citrus.

Unfortunately there has been a carry-over of citrus rootstocks from last year, so the demand for seed this year is still below average. We are hoping with the upturn of demand and prices there will be renewed interest in our industry.

The Auscitrus board have been cutting back on overheads, board fees have been on hold, and our secretariat has been taken over by our manager Tim. This has meant more work for Tim, but during tough times, tough action must be taken.

We will be phasing out our plantings at the Dareton Research Station over the next few years, which will result in further cost savings. Because of the cost of production and lack of seed sales we have terminated our Queensland seed agreement, again this will be a substantial saving in our next budget. The South Australian scheme will continue as a back up and a number of new seed trees will be planted of varieties in demand. Tim is on the S.A. committee which has been a help to the members in deciding their future backup plantings.

The problem of citrus greening is a big worry to the Australian industry, although not in the country as yet, we all know one day it could be. Auscitrus are looking at more screen houses, these of course cost money and with the downturn in budwood and seed sales, are out of our reach at this time. We are looking for support from outside sources for funding.

If and when this disease arrives, all budwood will need to be in screen houses and possibly all nurseries will need to produce all trees in screen houses. This will be a huge cost to the whole industry, including the growers buying the trees.

There are still nurseries cutting some non-approved budwood to use on nursery trees; although this saves a few dollars it is not helping to keep the scheme afloat. Greater support from these nurseries would be appreciated.

As Chairman I hope that all budwood from PVR Varieties would be directed through Auscitrus. This should be a must for all Directors and Executive Committee Members, to keep face with and set an example to nurseries and growers.

I am sure that if we can live with a lower dollar, the industry will lift as in the last few months packers are looking for more fruit at much better prices.

Again I thank Tim and his small staff for their extra efforts this year, and hope that we can all look towards an improved future for Auscitrus.

Mike Arnold A.F.S.M.

## MANAGER'S REPORT

As detailed below budwood sales for 2012/13 were down, at around 460,000 buds. Seed sales for the previous year were around 780kgs, of which around 700kgs were sold in Australia. At 4000 seeds per kg, and very conservatively assuming 50% of those seeds end up as a budded nursery tree, that amounts to 1.4 million nursery trees. This means there are a lot of trees produced in Australia using budwood that is not from a tested source.

This poses a significant risk to the wider Australian citrus industry through the spread of graft transmissible diseases, but also to the nursery operators who continue to work outside the well-established best practice protocols that the budwood scheme promotes. All nurseries must endeavour to use tested budwood whenever it is available – cost cutting shortcuts pose a huge risk to our industries, both to growers and to nurseries. While nurseries may be getting away with it *for now*, graft transmissible diseases are invisible and readily transmitted from tree to tree via budwood – eventually these nurseries will get caught out.

Auscitrus has been operating in one form or another for over 90 years, and providing disease tested budwood out of Dareton for almost 50 years. Australia has a relatively clean and productive citrus industry because of the work of Auscitrus and NSW DPI over these decades. As such it is easy to become complacent, however graft transmissible disease are insidious and destructive. The citrus budwood scheme exists for a reason; if these diseases weren't so serious we wouldn't be investing so much effort into controlling them.

Growers and retailers are urged to insist on nursery trees produced using tested material. There is a duty of care to the wider citrus industry to prevent the spread of disease, but also a significant and real financial risk to commercial growers. Using tested budwood is a relatively cheap and reliable insurance for orchards and nurseries alike.

Tim Herrmann  
Auscitrus Manager

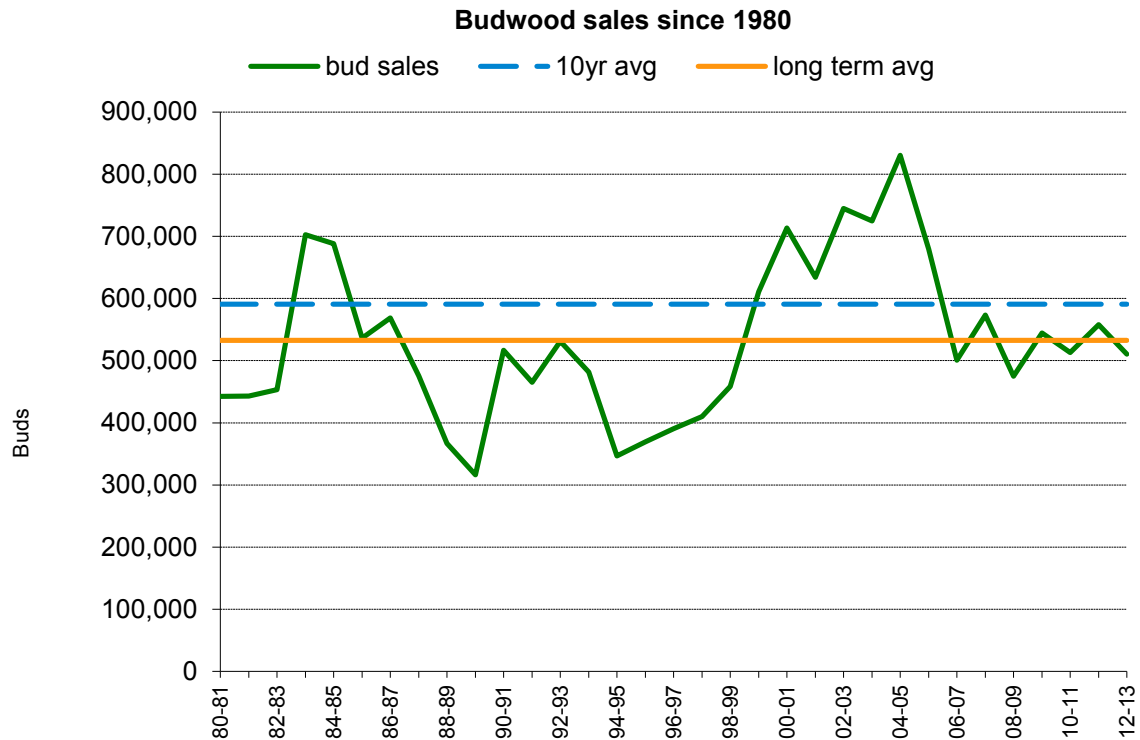


Figure 1 Healthy tree on the left, viroid infected tree on the right, both trees are the same age.

# AUSCITRUS ANNUAL REPORT 2013

## BUD SALES

Total bud sales for 2012/13 were 457,313 buds, down from previous years and below the long term average. An additional 53,460 buds of private varieties were sold (included in chart below).



The top ten selling varieties for 2012/13 were:

Variety	Buds sold
All private varieties	53460
Mandarin Imperial	39205
Mandarin Murcott	34900
Lime Tahiti	34210
Navel Washington	30400
Valencia Keenan	29260
Mandarin W. Murcott Afourer	25355
Lime Kaffir Eyles	24106
Mandarin Emperor	23630
Satsuma Okitsu	20430

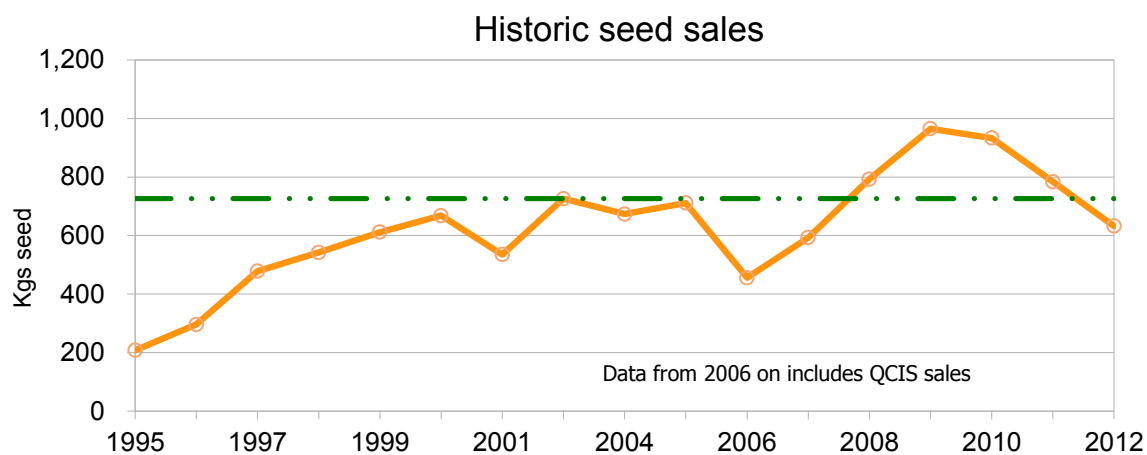
There were some minor shortages of some minor varieties, however there is now excess budwood of all significant varieties and production is increasing at the new Auscitrus property on River Road in Dareton.

Planting at the new budwood orchard is almost complete, and harvest of buds from the new blocks will be phased in as trees fruit and are proven true to type.

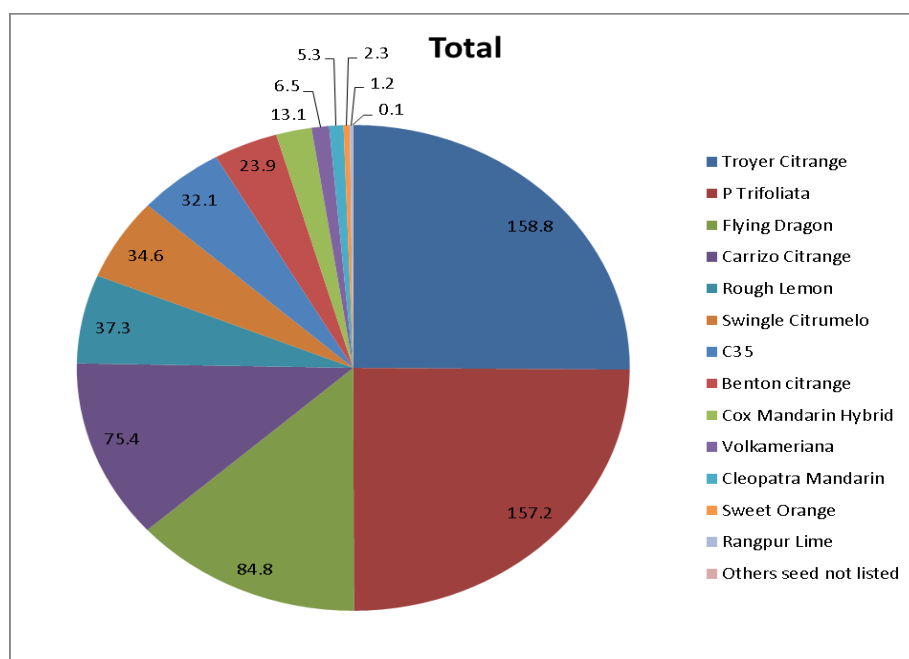
# AUSCITRUS ANNUAL REPORT 2013

## SEED SALES

Seed sales for 2012/13 totalled 632 kgs, also down from the long term average:



Major sellers were Troyer citrange, *P trifoliata*, Flying Dragon and Carizzo citrange.



Seed orders for 2013/14 currently total 487 kgs, although it is normal to receive late orders of around 100kgs during the season.

There will be a small shortfall of Benton citrange due to the closure of the Queensland seed scheme which previously supplied the majority of the Benton seed. Yields are increasing every year so this isn't a long term problem.

A good amount of Flying Dragon and some Tri was harvested from the Dareton research station blocks, however all other seed has been sourced from the new plantings at River Road, with most varieties in significant excess. No seed was sourced from Monash but it is being maintained as a backup block.

## AUSCITRUS OPERATIONS AT EMAI

Elizabeth Macarthur Agricultural Institute (EMAI) is located in a non citrus producing area at Menangle, on the outskirts of south western Sydney. At EMAI there is a NIASA accredited nursery and laboratories that are certified under ISO 9001. Auscitrus is involved in 2 main areas at EMAI:

- Citrus Foundation Repository
- health status testing of its commercial budwood and rootstock seed trees

The following report covers activities during the 2012/13 financial year.

### CITRUS FOUNDATION REPOSITORY

#### Repository for high health status clones, EMAI & Dareton

The repository currently holds over 160 high health status citrus clones with at least 1 tree of each variety held in screen houses in 2 locations at Dareton and EMAI.

The high health status repository at EMAI fills 2 screen houses, with over 50 private varieties held separately from the public varieties. All fruit observed on EMAI repository trees are photographed and the images are maintained in a database.

Two new domestic varieties entered the repository over the 2012/13 year (April 2013) and mother trees were placed in the EMAI and Dareton repositories.

#### Repository for pre-immunised clones, EMAI

The repository for pre-immunised clones is housed in a controlled environment greenhouse at EMAI. This repository contains over 80 citrus clones that have been pre-immunised with a mild strain of citrus tristeza virus (CTV). This 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.

Trees in the citrus repositories are tested regularly for graft-transmissible pathogens. Refer to the section on 'Health status testing for citrus pathogens' for testing details.

The maintenance and testing of public varieties is funded by HAL and Auscitrus via VC project CT10008 'Protecting Australia's citrus genetic material' from July 2010 to June 2015. The maintenance and testing of private varieties is covered by a contract agreement between the private variety owner and Auscitrus and 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 that we test for have been detected in these trees using our 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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# AUSCITRUS ANNUAL REPORT 2013

## HEALTH STATUS TESTING FOR CITRUS PATHOGENS

### Citrus viroids

All budwood source trees are tested every 3 years for citrus viroid infection using biological indexing methods on Etrog citron indicator plants. All suspect results from the biological indexing are investigated further using molecular techniques.

Viroid testing commenced for 273 Auscitrus budwood multiplication trees during the 2012/13 year. Viroid testing was completed for 545 Auscitrus budwood multiplication trees during the 2012/13 period.

A decision was made in 2010 to test all repository trees for viroids using molecular methods. Many varieties had not undergone molecular testing for viroids since their release from post-entry quarantine. Over the past 2 years repository trees at EMAI and Dareton have been tested for citrus viroids I, II, III, IV and exocortis. Testing is now complete.

Some pre-immunised trees have also been tested for viroids using molecular techniques. Testing will be completed in spring 2013.

Citrus viroids IV and V are not known to occur in Australia. Positive control material for citrus viroids IV and V was obtained from scientists at the California Citrus Clonal Protection Program. The team has been working to develop the molecular method for CVd IV over the past year. Honours student Ossie Wildman (University of Western Sydney) did not detect CVd IV in the EMAI repository trees.

### Citrus tristeza virus (CTV)

CTV is endemic throughout Australia. There are many strains of the virus from mild to severe causing a range of disease symptoms.

Every tree in the citrus repositories is tested annually for the presence of CTV using a serological test called 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 pre-immunised trees.

Trees in the EMAI screen house repositories for high health status clones were tested for CTV by DTBIA in autumn 2013 with no CTV detected. Trees in the Dareton repository were tested in October 2012 with no CTV detected. The Dareton repository trees will be retested in October 2013.

All trees in the pre-immunised repository tested positive for CTV in autumn 2013, except for Afourer TID#5089, Herps #5141, IRM1 #5164 and Afourer #5196. A number of trees were weakly positive but viral particles were still detected. Budwood is only sourced from pre-immunised trees that have tested positive for CTV during the past year.

All grapefruit trees in the budwood multiplication blocks are tested annually to confirm the presence of a mild isolate of CTV that protects trees against more severe grapefruit stem pitting strains. Molecular testing conducted in 2008 detected more than 1 strain of CTV in many trees.

During the 2012/13 financial year, 77 grapefruit trees from budwood multiplication blocks at Dareton were inoculated onto West Indian lime indicator plants to check for the presence of the mild pre-immunising strain of CTV. Biological indexing results confirm the presence of a mild protective CTV strain in the trees.

### Citrus psorosis virus

Budwood multiplication trees are tested for psorosis virus every 9-12 years via biological indexing. During the 12/13 year, 226 budwood multiplication trees were tested for psorosis. No psorosis symptoms have been observed on the foliage of the indicator plants. The stems were peeled to look for symptoms of CTV stem pitting and results recorded. Psorosis indexing commenced for an additional 180 trees in this period.



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# AUSCITRUS ANNUAL REPORT 2013

## Citrus tatterleaf virus

Repository trees on tolerant (symptomless) rootstocks are tested for citrus tatterleaf virus (CTLV) every 9-12 years. Samples from a subset of EMAI repository trees were inoculated onto Rusk citrange indicator plants in October 2010 and no CTLV symptoms were observed. Trees have also been tested for CTLV using molecular techniques including 32 EMAI repository trees and all 188 Dareton repository trees. Molecular testing is in progress for the remaining EMAI trees on CTLV tolerant rootstocks using the same extracts that were used for viroid testing; 58 have been tested to date with no detections.

## Field inspection

The Auscitrus budwood multiplication blocks at Dareton Agricultural Research and Advisory Station were inspected on 25 October 2012 by the Auscitrus indexing officer. All trees in the budwood blocks 2 and 4 were inspected for disease symptoms and off-type shoots.

Unthrifty trees potentially infected by graft-transmissible pathogens were identified and subsequent testing was performed. Suspect trees and off-type shoots were reported to Auscitrus in person immediately after the inspection.

## GENERAL BUSINESS

### Pathogen elimination

Viruses and viroids can be removed from infected mother trees by shoot tip grafting and heat treatment. Successful shoot tip grafted plants then require testing to determine if all known pathogens have been eliminated.

Currently 13 private varieties and 2 public varieties are in the system and are being tested. Six private varieties are undergoing shoot tip grafting.

Over the past year pathogens have been successfully eliminated by shoot tip grafting from 2 varieties which have now entered the repository system. No pathogens were detected in a third variety which has also entered the repository. Pathogens were not detected in 2 shoot tip grafted plantlets of an additional 2 private varieties; these will be re-tested when sufficient material is available. A number of newly produced plantlets will also be tested when sufficient material is available.

Auscitrus team members at EMAI have taken on additional nursery duties after the removal of NSW DPI gardener support to the nursery. They have also attended chemical courses to fulfil WHS requirements.

### Student projects

Ossie Wildman successfully completed his Honours degree with the University of Western Sydney and NSW DPI under the supervision of Associate Professor Paul Holford and Nerida Donovan, with assistance from Sylvia Jelinek and Grant Chambers. Ossie worked on a multiplex PCR technique for citrus viroids that allows more than 1 viroid to be tested for at 1 time. There was some success with the protocol but it needs further work before it can be used in the Auscitrus indexing program. Ossie also collected evidence that it's better to test bark than leaves for viroids, worked on a new test for citrus viroid IV and did some preliminary work on differentiation of citrus viroids (IIa and IIb) using real-time PCR with high resolution melt analysis.

Jack Braithwaite was a 3<sup>rd</sup> year student from the University of Western Sydney who did a project at EMAI under the supervision of Paul, Nerida and Grant. He did preliminary work on the differentiation of Australian variants of CVD III using real-time PCR and high resolution melt analysis.

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# AUSCITRUS ANNUAL REPORT 2013

## Quality assurance

The EMAI nursery is NIASA accredited and the Citrus Pathology and Soil Health Team is ISO 9001:2008 certified. The EMAI repository for high health status citrus clones is also accredited as an MPI NZ off-shore quarantine facility (renewed in April 2010). The team was inspected and audited during the 2012/13 financial year and maintained their NIASA accreditation and ISO certification. The Auscitrus and EMAI management committee has also inspected the site.

## Staff

NSW DPI staff involved with Auscitrus activities at EMAI during the 12/13 financial year:

Sylvia Jelinek	Auscitrus Indexing Officer
Aida Ghalayini	Molecular biologist (1d/wk July-Aug 2012)
Allise Fail	Nursery Assistant (2.5d/wk)
Grant Dell	Head Gardener (July 2012 – Jan 2013)
Craig Gaunson	Gardener
Nerida Donovan	Citrus Pathologist