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## Managing biosecurity risks to Australian citrus

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### Abstract

The high health status of Australian citrus germplasm has been maintained largely due to a successful quarantine system and propagation scheme. Most endemic graft transmissible diseases are rarely observed in Australian orchards due to the use of high health status propagation material supplied by Auscitrus. Citrus tristeza virus is present throughout the citrus growing areas although mild strain cross protection has been effectively managing grapefruit stem pitting in white grapefruit varieties for over 40 years. However, diseases like huanglongbing and canker are ever present threats to the biosecurity of the Australian citrus industry. The introduction of mandatory nursery registration and compulsory use of pathogen tested propagation material would provide greater security to the industry in the face of increasing biosecurity threats.

**Keywords:** graft-transmissible, repository, propagation scheme

### Introduction

Citrus is one of the largest and most important horticultural export commodities in Australia, producing around 600 thousand tons annually (Citrus Australia Limited pers. comm.), although on the world scale this represents less than 1% of production. The introduction of new pathogens poses a major risk to Australian citrus. Strict post entry quarantine protocols in Australia require that all imported citrus varieties are shoot tip grafted in vitro and tested for exotic and endemic pathogens by the Department of Agriculture, Fisheries and Forestry before their release. Today most new varieties are imported by private individuals or variety managers rather than by government or industry organizations.

### Propagation scheme

Auscitrus is the national ‘not for profit’ industry organization responsible for the supply of high health status and true to type citrus seed and budwood (private and public varieties) to the Australian citrus industry. Graft-transmissible pathogens like citrus psorosis virus (CPsV), citrus tatter leaf virus (CTLV), and citrus exocortis viroid (CEVd) are rarely seen in Australian orchards due to the success of the Auscitrus budwood scheme. However, the use of Auscitrus budwood is voluntary and not all nurseries are supplying citrus trees that have been propagated from pathogen tested material.

Auscitrus maintains Australia’s citrus foundation trees in 2 secure repositories funded by the citrus industry levy

and private variety owners. Auscitrus also provides a pathogen testing and pathogen elimination service through a partnership agreement with the New South Wales Department of Primary Industries (NSW DPI) for locally selected private varieties to produce high health status mother trees for entry to the repository system. Varietal selections from Queensland can only be commercialized in other states if budwood is sent to NSW DPI’s Elizabeth Macarthur Agricultural Institute (EMAI) for testing and pathogen elimination. There is legislation prohibiting the movement of citrus plant material (except for fruit and rootstock seed) from Queensland to other Australian states due to the presence of strains of Citrus tristeza virus (CTV) that induce severe stem pitting symptoms in oranges.

The National Citrus Repository for High Health Status Clones currently holds over 160 citrus varieties including more than 50 private varieties, with at least 1 mother tree of each variety in each location. Repository houses are located at NSW DPI EMAI in the Sydney basin and at the Auscitrus property at Dareton in the Sunraysia growing region. The trees held at Dareton are exposed to ideal growing conditions and, whilst the climate at EMAI is not as suited to the growth of citrus, its isolation from the citrus growing regions reduces the risk of infection in the event of an exotic disease incursion. At EMAI there is also a repository for high health status foundation trees that have been inoculated with a mild strain of CTV. Mild strain cross protection has been effectively managing grapefruit stem pitting in white grapefruit varieties for over 40 years.

The EMAI repository is currently an accredited offshore plant quarantine facility for the New Zealand Ministry of Primary Industries. There are limited quarantine facilities for citrus in New Zealand. New citrus varieties may only be introduced to New Zealand from Australia if sourced from the EMAI repository, material is then allowed to enter the country under a lower quarantine rating and rapid nursery multiplication can commence upon entry.

High health status and inoculated foundation trees are routinely tested by NSW DPI to provide material for the establishment of budwood supply trees. Budwood and rootstock seed supply trees are also tested. Repository mother trees and inoculated grapefruit budwood supply trees are tested annually for CTV. The indexing schedule aims to test repository and budwood supply trees every 3 to 4 years for CEVd, every 9 to 12 years for CPsV and orange stem pitting strains of CTV, and trees on tolerant rootstocks are tested every 9 to 12 years for CTLV. Rootstock seed supply trees are scheduled for CLB testing every 10 years. Other pathogens are tested for as needed, for example when new pathogens are reported in the literature. Combinations of biological, serological and molecular methods are used for pathogen testing. Trees are removed from the system if any pathogens are detected or if fruit or foliage are observed to be off-type.

The rise in importance of private varieties (both imported and local) has put increased pressure on traditional budwood production, requiring a shift by Auscitrus towards rapid nursery multiplication of high demand varieties. Budwood is also cut from multiplication trees planted in the field. Generally, nurseries who purchase Auscitrus buds do not multiply their own budwood. Budwood multiplication and seed supply are commercially funded, with Auscitrus budwood and seed operations receiving no monetary support from industry or government.

### **Preparing for the future**

Although some of the world's worst citrus pathogens like huanglongbing (HLB) are not known to occur in Australia, Auscitrus has recognized that there is a need to move towards a protected (screened) budwood supply system. HLB and associated insect vectors pose a significant threat to Australia, given our proximity to the Indonesian Archipelago and New Guinea where the disease is known to occur, and the high amount of visitor traffic from countries where the disease is present. Movement of the pathogen and its vectors eastward from Asia to Australia through cyclonic winds or illegal movement of infected plant material is highly likely. In the event of a HLB incursion it would be difficult to track 'at risk' commodities like citrus and orange jasmine (*Murraya* sp.) because currently Australia does not have mandatory nursery registration.

The Australian citrus industry, in partnership with Auscitrus, must move towards a mandatory certification scheme combined with nursery registration across all states and territories to maintain the high health status of citrus

germplasm and allow industry and government to respond more efficiently to new disease threats. These changes will ensure the future of our industry in the face of increasing biosecurity risks.