

**California Citrus Nursery Board-CCNB**  
 Dr. Georgios Vidalakis Final Report 2008

**Cooperative Registration Testing of Nursery Owned Citrus Scion and Seed Source Trees**

**2008**

The CCPP received 808 samples from 38 nurseries. From those 550 were from scion, 241 from seed, and 17 from both scion and seed registered tree sources. The 241 seed source samples were grafted onto the psorosis and psorosis like, including *Citrus leaf blotch virus* (CLBV), bio-indicator Dweet tangor while the remaining 567 samples (scion and scion & seed) were grafted onto both Dweet tangor and Etrog citron for the psorosis and citrus viroids testing respectively. There were no psorosis positive trees recognized in 2008 testing. On the contrary 30 scion and 2 scion & seed trees were positive for citrus viroids (Table 1).

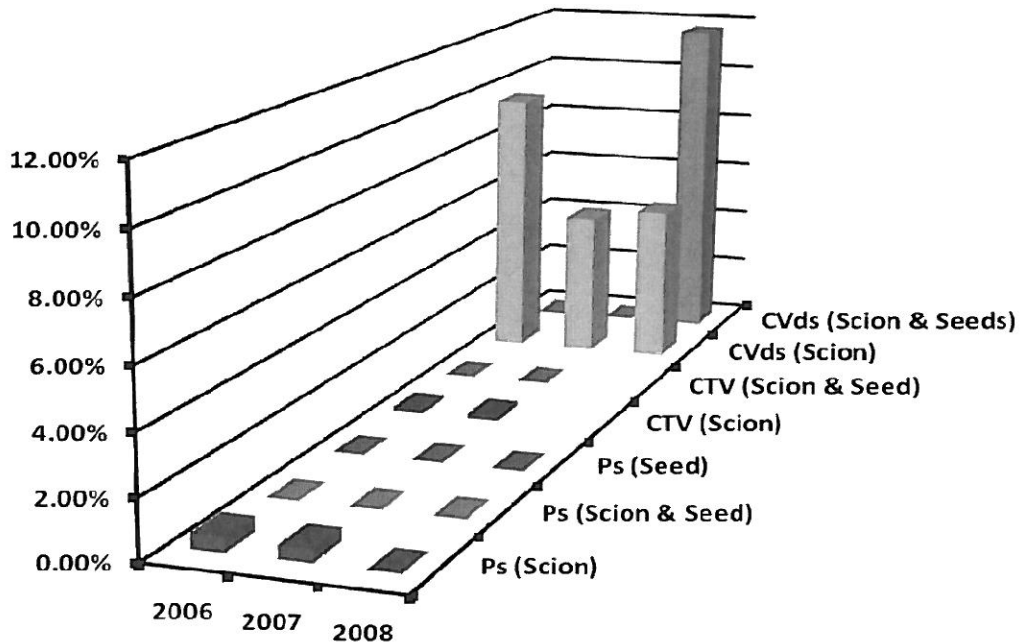
Table 1

Source tree	Samples	Ps	CVds
Scion	550	0	30
Seed	241	0	na
Scion & Seed	17	0	2
Total	808	0	32

Ps: Psorosis and psorosis like  
 CVds: Citrus viroids  
 na: not applicable

Between 2006 and 2008 the levels of psorosis and tristeza infection for the tested source trees was maintained below 1% while citrus viroids infections ranged from 4 to 12% (Fig. 1).

Figure 1. Percent of infection of tested nursery owned source trees for 2006-2008



From the 32 viroid positive samples 19 induced mild reactions (1-2) to the indicator Etrog citron related to the presence of the CVd-II group. The identity of CVd-II was also confirmed by imprint hybridization (Table 2). Based on the imprint hybridization results, five (5) samples out of the 13

that induced severe reactions (3-5) to the citron Etrog contained CVd-II, therefore we can hypothesize that these trees are infected with a mixture of citrus viroids.

Table 2

Citron/Hybridization Reaction	Number
Mild on Citron (1-2) – (CVd-II imprint confirmed)	19
Strong on Citron (3-5) – Exocortis & Exocortis like due to mix infections	13
Total	32

The type of citrus infected and the pathogen detected are presented in Table 3.

Table 3

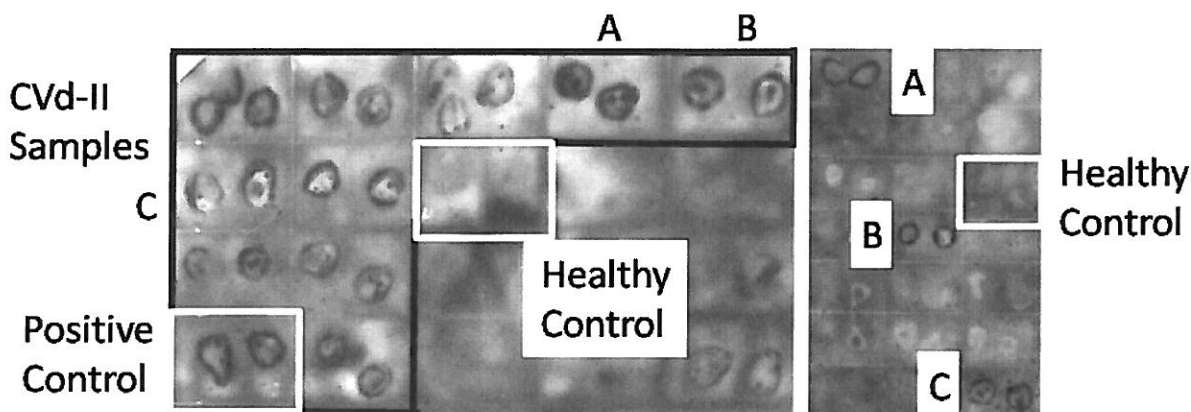
Ps	CVds	Number
	CITRANGE	2
	GRAPEFRUIT	2
	LEMON, Eureka	1
	LIMEQUAT	2
	LIMON	1
	ORANGE, Navel	18
	ORANGE, Valencia	3
	TANGELO	3

Ps: Psorosis and psorosis like

CVds: Citrus viroids

It is our permanent goal to make this program more efficient and as you all know this year the Central California Tristeza Eradication Agency (CCTEA) handled the CTV-ELISA testing for faster output of the results. This year the samples arrived in CCP in a timely manner with very few exceptions. In addition, the experiment we performed in order to validate the hybridization test with citron tissue from the first flush (last week of April) gave good results. All the positive controls of the CVd-II group were detected by the imprint hybridization without differences from the imprints at the end of the testing (last week of July) and therefore we can further discuss the option of performing hybridization sooner than summer (Fig.2). However, for the complete viroid profile of a source tree we will need to wait for the heat of the summer and the second citron flush for the symptom development.

Figure 2. Imprint hybridization of the first flush of Etrog citron inoculated with CVd-II group (black outline) with positive and healthy controls (white boxes). Example of imprint hybridization of the second flush of Etrog citron (right membrane) of the plants A, B, & C.



**2009 Registration (Began October 2008)**

As of today the CCPP has received 563 samples from 16 nurseries for the 2009 registration program. From those 469 were from scion, and 94 from seed tree sources. The seed source samples have been grafted onto the psorosis and psorosis like bio-indicator Dweet tangor and the scion source samples have been grafted onto both Dweet tangor and Etrog citron for the psorosis and citrus viroids testing respectively. Samples keep arriving at CCPP and inoculations will be performed accordingly. Results will be reported to CDFA as developed.