

California Citrus Nursery Board-CCNB

Dr. Georgios Vidalakis

2011-02-05 Final Report

Cooperative Registration Testing of Nursery Owned Citrus Scion and Seed Source Trees 2009-2010

The CCPP received 660 samples from 33 nurseries in the winter of 2009. The first sample arrived on November of 2009 and the majority of samples arrived on late December (just before Dec. 25th). This is the primary reason for this late report. In order for the CCPP to complete the biological and laboratory testing on a timely manner the nursery samples have to arrive during the month of October of the previous year.

From the 660 samples 504 were from scion and 156 from seed registered tree sources. The 156 seed source samples were grafted onto the psorosis and psorosis like, including *Citrus leaf blotch virus* (CLBV), bio-indicator Dweet tangor while the 504 scion samples were grafted onto both Dweet tangor and Etrog citron for the psorosis and citrus viroids testing respectively.

One (1) psorosis and twenty four (24) citrus viroids positive samples were identified among the 504 scion tree sources (Table 1). In addition, two (2) scion source trees induced a “vein enation reaction” on the Dweet tangor indicator. These samples were tested further on West Indian Lime, the standard indicator for vein enation disease, and the positive results were confirmed. All seed sources trees tested negative.

Table 1. Positive tests

Source tree	Samples	Ps	CVds	VE
Scion	504	1	24	2
Seed	156	0	na	na
Total	660	1	24	2

Ps: Psorosis and psorosis like

CVds: Citrus viroids

VE: Vein enation

na: not applicable

From the 24 viroid positive samples 10 induced mild reactions (1-2) to the indicator Etrog citron suggesting infection with the variants of the citrus viroid II (CVd-IIa, -IIb, -IIc, -909, variants of the *Hop stunt viroid*). CVd-II induces extremely mild reactions on Etrog citron and quite often the plant appears asymptomatic. Thus, additional laboratory testing is required to verify and/or identify more CVd-II infected samples. The presence of the CVd-II was confirmed by imprint hybridization while the test identified 14 additional CVd-II positive samples.

The type of citrus infected and the pathogen detected are presented in Table 2 while the registration results of the last five (5) years are summarized in Table 3.

Table 2. Citrus types tested positive

	Positives		
	CVds	Ps	VE
GRAPEFRUIT	2	0	0
MANDARIN	6	0	0
SWEET ORANGE	10	0	1
TANGELO	2	0	0
KUMQUAT	1	1	0
LIME	0	0	1
CALAMONDIN	1	0	0
PUMMELO	2	0	0
Total	24	1	2

Ps: Psorosis and psorosis like

CVds: Citrus viroids

VE: Vein enation

Table 3. Historical data of registration testing

<i>Infection (%)</i>	Scion Source Trees				Seed Source Trees		Scion Source Trees		Seed Source Trees
	<u><i>Avg: 2.0</i></u>	Psorosis (Ps)	Citrus Viroids (CVds)		Psorosis		Psorosis (%)	Citrus Viroids (%)	Psorosis (%)
Year	Tested	Ps (+)	Tested	CVds (+)	Tested	Ps (+)	<u><i>Avg: 0.3</i></u>	<u><i>Avg: 5.9</i></u>	<u><i>Avg: 0.0</i></u>
2005-06	394	2	420	40	309	0	0.5	9.5	0.0
2006-07	448	2	446	23	285	0	0.4	5.2	0.0
2007-08	550	0	539	30	241	0	0.0	5.6	0.0
2008-09	446	1	446	19	198	0	0.2	4.3	0.0
2009-10* VE(2+)	504	1	504	24	156	0	0.2	4.8	0.0

Ps: Psorosis and psorosis like

VE: Vein enation

Avg: Average

Approximately 2400 scion samples and 500 seed samples for the 2010-2011 Registration program have arrived at the CCPP. Scion samples have been inoculated on Etrog citron in combinations of two since this year there is a great need to process a large number of samples in order for the new mandatory registration program to be implemented. Seed source samples have been inoculated on Dweet tangor.