

**California Citrus Nursery Board-CCNB**  
Dr. Georgios Vidalakis Final Report 2009

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

The CCPP received 644 samples from 21 nurseries. From those 446 were from scion and 198 from seed registered tree sources. The 198 seed source samples were grafted onto the psorosis and psorosis like, including *Citrus leaf blotch virus* (CLBV), bio-indicator Dweet tangor while the 446 scion samples were grafted onto both Dweet tangor and Etrog citron for the psorosis and citrus viroids testing respectively. There was one (1) psorosis and 19 citrus viroids positive tree sources recognized in the 2009 testing (Table 1).

**Table 1**

Source tree	Samples	Ps	CVds
Scion	446	1	19
Seed	198	0	na
Total	644	1	19

Ps: Psorosis and psorosis like

CVds: Citrus viroids

na: not applicable

From the 19 viroid positive samples 13 induced mild reactions (1-2) to the indicator Etrog citron. The presence of the CVd-II was confirmed by imprint hybridization for 12 of these cases (Table 2). Based on the imprint hybridization results, four (4) samples out of the six (6) 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)	13
<i>Mild on Citron (1-2) – (CVd-II imprint confirmed)</i>	12
Strong on Citron (3-5) – Exocortis & Exocortis like due to mix infections	6
Total	19

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

**Table 3**

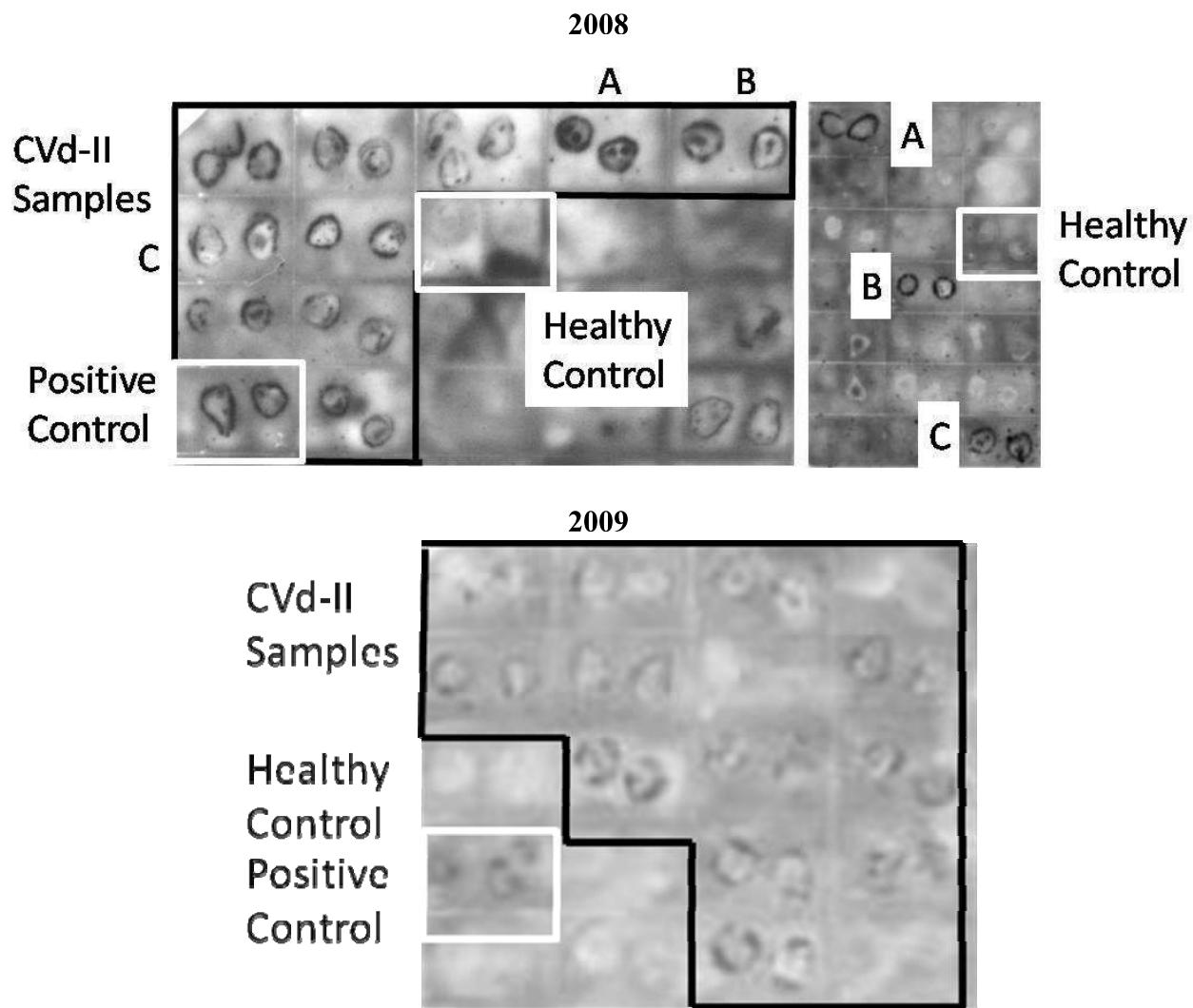
	CVds Number	Ps Number
BLOOD ORANGE	1	
GRAPEFRUIT	1	
LEMON	2	
MANDARIN	4	1
ORANGE	9	
TANGELO	2	

Ps: Psorosis and psorosis like

CVds: Citrus viroids

The experiment we performed in order to validate the hybridization test with citron tissue from the first cut (end of April beginning of May) gave similar results as last year. 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 (end of July beginning of August) 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.



The first samples of the 2010 Registration program arrived at the CCPP in November of 2009.