

RED BLOCH VIRUS IN GRAPES

CAPCA Chapter Tulare

November 13, 2013

Deborah Golino UC
Davis



Grapevine Virus Diseases



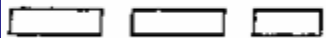
(+) ssRNA



Tobamovirus



Tobravirus



Hordeivirus



Furovirus



Potexvirus



Capillovirus, Trichovirus



Carlavirus



Potyviridae



Closterovirus



Sesquiviridae

Tombusviridae

Dianthovirus

Luteovirus

Machlomovirus

Marafivirus

Necrovirus

Sobemovirus

Tymovirus



Comoviridae



Enamovirus

Idaeovirus



Bromoviridae

Cucumovirus

Bromovirus

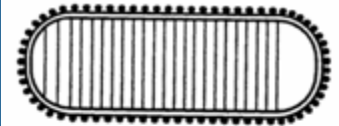


Ilarvirus



Alfamovirus

(-) ssRNA



Rhabdoviridae

Cytorhabdovirus

Nucleorhabdovirus



Bunyaviridae

Tospovirus



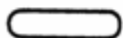
Tenuivirus

Types of Plant Viruses

dsDNA



Caulimovirus



Badnavirus

ssDNA



Geminiviridae

Geminivirus



Subgroup I, II



Subgroup III



Isometric
Banana bunchy top virus group

dsRNA



Reoviridae

Phytoreovirus

Fijivirus

Oryzavirus



Partitiviridae

Alphacryptovirus

Betacryptovirus

FPS Target Grapevine Diseases

Grapevine Degeneration

- Fanleaf

Grapevine Decline

- Tomato Ringspot Virus

Leafroll

Rugose Wood Complex

- Kober Stem Grooving
- Corky Bark
- LN33 Stem Grooving
- Rupestris Stem Pitting

Fleck

Minor Viruses



Association of a Circular DNA Virus in Grapevines Affected by Red Blotch Disease in California

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Yr. 2009

- Grapevines showed 'leafroll-like' symptoms.
- Tested negative for known grapevine viruses.
- Lower sugar accumulation.
- Delayed harvest.
- No stem markings.

UCDavis-VES: Cabernet Sauvignon 4/101-14

Oakville Cabernet Franc 214/101-14

Rutherford Cabernet Sauvignon 337/039-16

Calistoga Several scions on AXR-1

(Cabernet Sauvignon, Merlot, and Zinfandel)



Next Generation Sequencing





Grapevine red blotch on Cabernet Franc





Zinfandel 1A on AXR, Fall 2011





Foundation
Plant
Services

<http://fps.ucdavis.edu>

Foundation Plant Services
UCDAVIS

Foundation Plant Services:

- ⌘ Produces, tests, maintains and distributes elite disease-tested plant propagation material
- ⌘ Provides plant importation and quarantine services, virus testing and elimination
- ⌘ Coordinates release of UC patented horticultural varieties
- ⌘ Links researchers, nurseries, and producers

CROP PROGRAMS AT FPS

⌘ Grape

⌘ Rose

⌘ Strawberry

⌘ Sweet potato

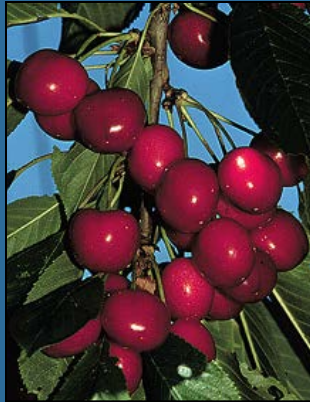
⌘ Tree

⌘ Pistachio



GRAPES

CALIFORNIA REGISTRATION & CERTIFICATION PROGRAMS



FRUIT & NUT TREES

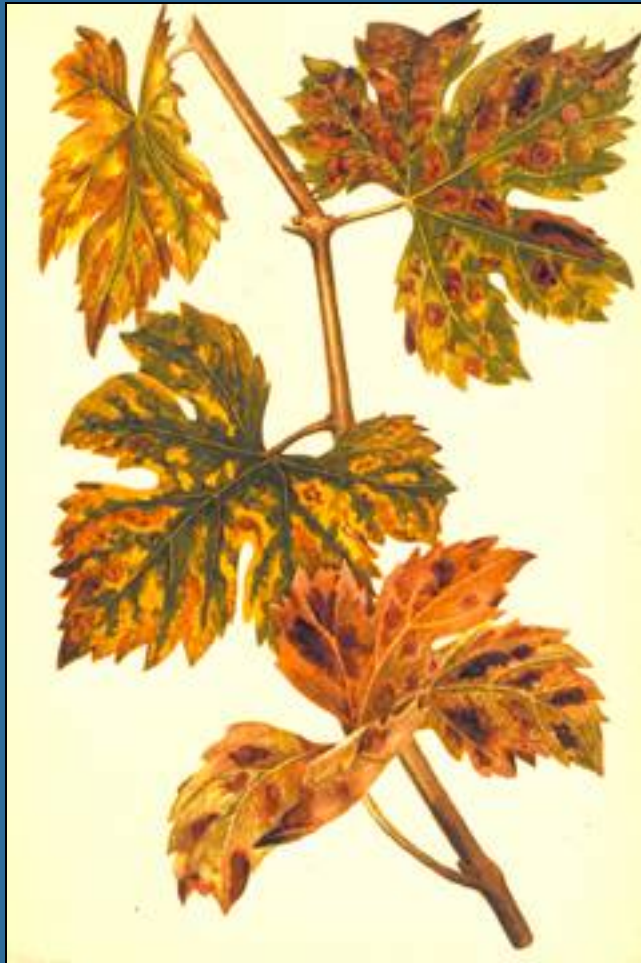


STRAWBERRIES





THE DANGERS OF SAMSONITE IMPORTATION

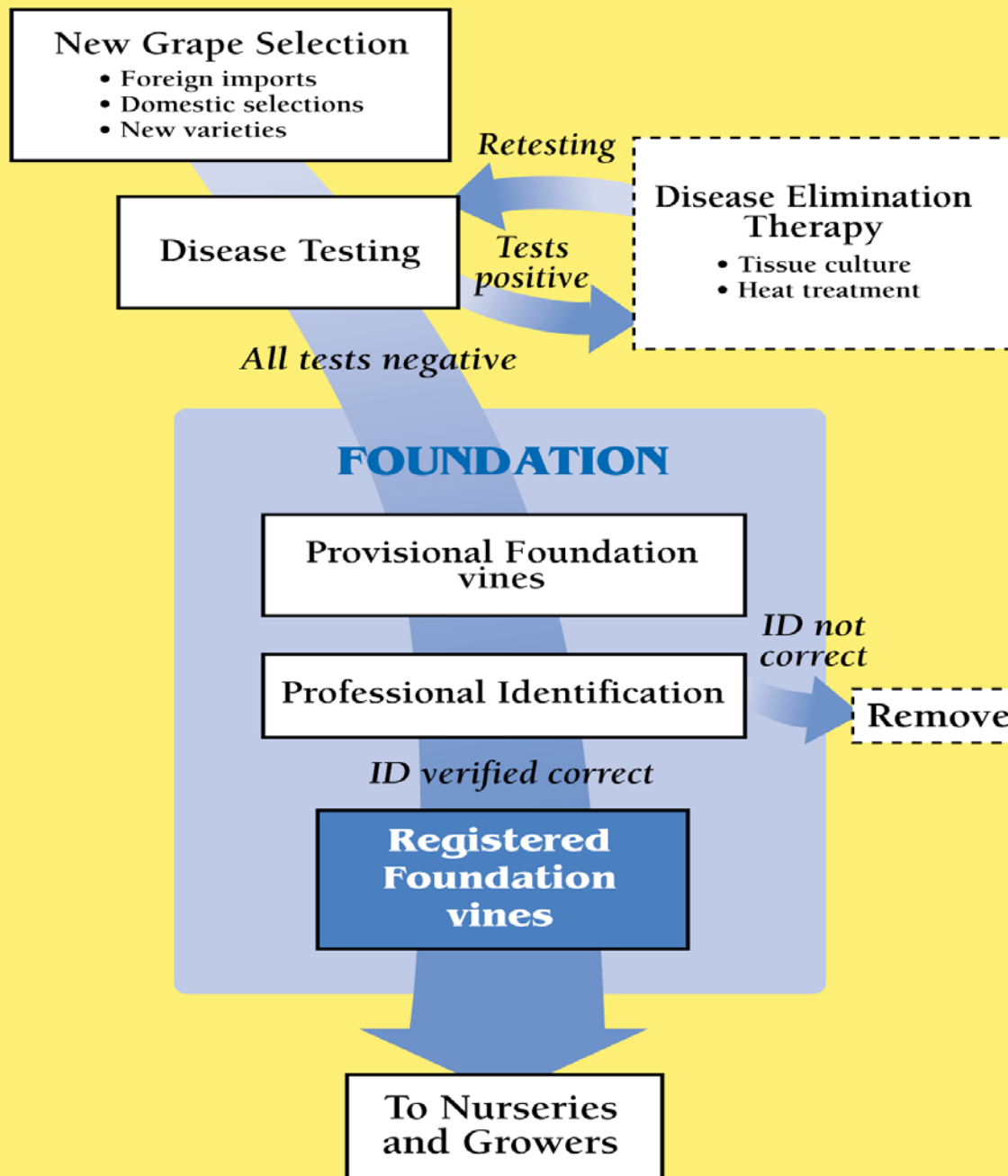


Pierce's Disease



PPV on nectarine

Why do you need clean
plant material?

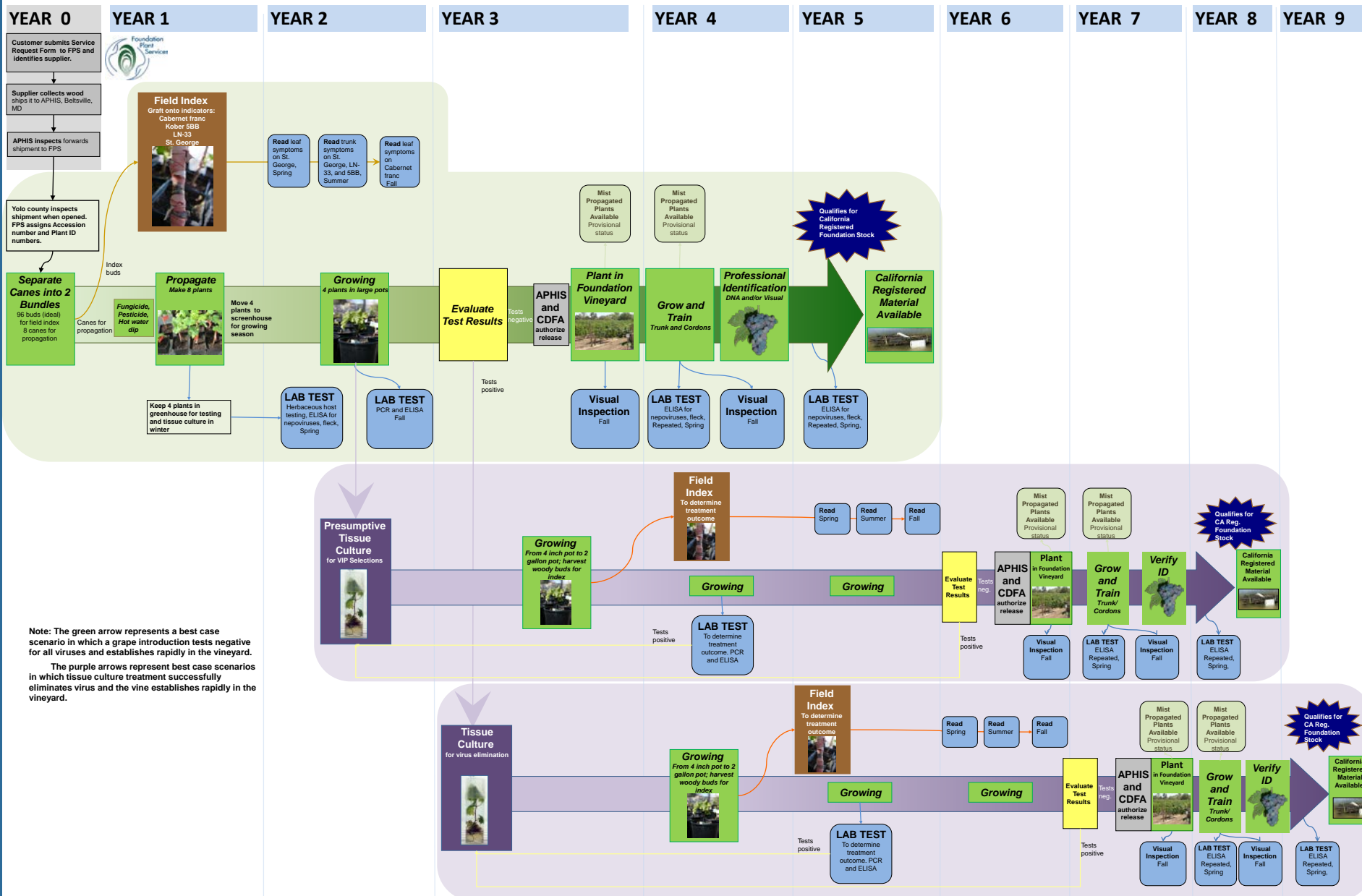


SHOOT TIP CULTURE



Process Description: Grapevine Importation through Foundation Plant Services, UC Davis (Simplified)

Document # FPS2012-01 © UC Regents 5. Sim Revised March 6, 2012



**What about Red Blotch in
Russell Ranch or the
Classic Foundation
Vineyard?**

Classic Foundation Vineyard

GRBaV-Infected Plants at FPS Vineyards

Variety	Area	Block	Row #	Plant #
Chardonnay 68	BKN	D	3	8
Thomcord 02	BKN	E	8	3
Ruby Cabernet 02	NYL	D	3	3
Orange Muscat 02	BKN	A	15	2
Chardonnay 49	NYL	C	17	8
Chardonnay 39	NYL	C	17	16
Chardonnay 41	NYL	C	18	7
Chardonnay 37	NYL	C	18	16
Marsanne 574	NYL	I	13	2

Total vines tested: RR = 1102 and Classic Vineyards = 3068 vines

Variety	Area	Block	Row	Plant #	RB-PCR	pH	Brix
Orange Mus. 02	BKN	A	15	1	Neg	4.2	26.5
Orange Mus. 02	BKN	A	15	2	Pos	4.2	27.0
Chardonnay 68	BKN	D	3	7	Neg	3.9	31.5
Chardonnay 68	BKN	D	3	8	Pos	3.9	27.0
Thomcord 02	BKN	E	8	4	Neg	3.8	26.0
Thomcord 02	BKN	E	8	3	Pos	3.9	19.0
Chardonnay 49	NYL	C	17	9	Neg	4.0	29.0
Chardonnay 49	NYL	C	17	8	Pos	4.0	30.0
Chardonnay 39	NYL	C	17	15	Neg	3.9	28.0
Chardonnay 39	NYL	C	17	16	Pos	4.1	28.0
Chardonnay 41	NYL	C	18	6	Neg	4.0	28.0
Chardonnay 41	NYL	C	18	7	Pos	4.1	29.0
Chardonnay 37	NYL	C	18	15	Neg	4.0	28.5
Chardonnay 37	NYL	C	18	16	Pos	4.1	29.0
Ruby Cab. 02	NYL	D	3	4	Neg	3.6	25.0
Ruby Cab. 02	NYL	D	3	3	Pos	3.6	23.0
Marsanne 574	NYL	I	13	1	Neg	4.0	23.0
Marsanne 574	NYL	I	13	2	Pos	4.1	24.5



Cabernet Sauvignon



Orange Muscat



Chardonnay 68



Chardonnay 41



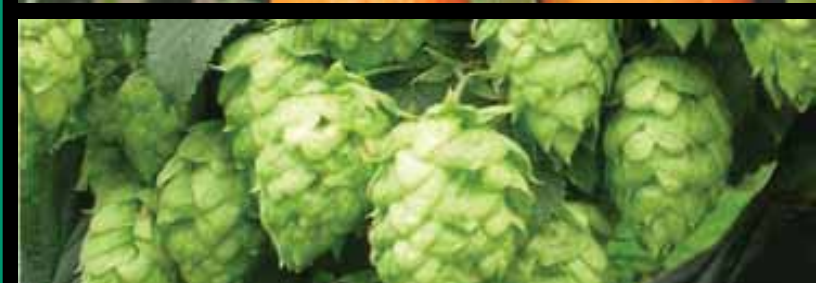
Ruby Cabernet 02

Field Index on Cab. Franc

Plant ID	LR-PCR	GRBaV-PCR	Cab. F. Index
52429	Pos	Pos	Pos
52289	Neg	Pos	Pos
52415	Neg	Pos	Pos
52674	Neg	Pos	Pos
52702	Pos	Pos	Pos
52814	Pos	Pos	Pos
52345	Neg	Pos	Pos
52373	Neg	Pos	Pos
52856	Neg	Pos	Pos
52940	Pos	Pos	Pos
52387	Pos	Pos	Pos



The National Clean Plant Network



New Russell Ranch Foundation Vineyard

established 2010, Davis California



October, 2012

Qualification of Russell Ranch Foundation Vines – Grapevine Disease Testing Protocol 2010

- 1) Microshoot tip tissue culture therapy
- 2) Negative test results - long list of pathogens - index, herbaceous, ELISA and PCR tests
- 3) *Agrobacterium vitis* testing at Cornell

What about Red Blotch in Russell Ranch Foundation Vineyard?



Thank you

