

Trunk diseases in NE America, their nature, detection and control

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Grapevine Trunk Diseases are newish

- International Council of Grapevine Trunk Diseases <http://icgtd.ucr.edu/>, Began 1998
- “older” diseases
 - Esca, Eutypa, both in Mediterranean climates
- “Newer” diseases
 - *Botryosphaeria* (Bot canker)
 - *Phaeomoniella* (Black goo, Petri Disease)
 - *Cylindrocarpon* (Black foot)
 - *Phomopsis viticola* forgotten in NY???

Trunk disease fungi found in NE USA, Midwest, R Smart, Mike White Iowa

- *Botryosphaeria dothidea* "Bot"
- *Phomopsis*
- *Cytospora viticola* New GTD, NE USA
- *Diatrypella*, *Eutypa*
- *Phaeomoniella*, *Phaeoachremonium* Esca
- *Seimatosporium*, Dead Arm
- *Pestalopsis*, New GTD, E, NE USA
- What might be found in your region?

Why is there more concern about Trunk Diseases now?

- Has something changed? Yes, probably, see later....
- Why do we now hear of new Trunk Disease fungi? Ie *Botryosphaeria*, *Phaeoachremonium*, *Cylindrocarpon*, *Phomopsis*, maybe *Fusarium*
- How serious a problem are they?
- "*They occur everywhere grapevines grow.....everywhere*"

Botryosphaeria Canker, Dead Arm

- Now considered the major GTD in California, recent survey 2006, over 90% incidence, nine species. **IT KILLS VINES**
- Probably similar in many European countries, not so well studied.
- Spreads by wound infection in **wet weather** when spores are produced
- Common disease in young, grafted vines due to rootstock cutting infection.
- **Nurserymen are the most likely cause of recent spread of GTD world wide**

Petri Disease, Black Goo

- Came to attention in 1990's during replanting in California with different rootstocks after failure of AXR1
- Newly planted vineyards variable, some died, black tarry spots in xylem of rootstock.
- Now occurs world wide in young grafted plants, *Phaeochremonium* etc
- Problem is contaminated rootstock cuttings used for grafting.

My experience...

- I have been in vineyards for 54 years
- Why am I now seeing so much trunk disease, everywhere I go?
- Was I blind before? Or just unfamiliar with symptoms
- Or is it something new? In young vines? And older vines?
- (or is it following me around?)

My First significant experience....

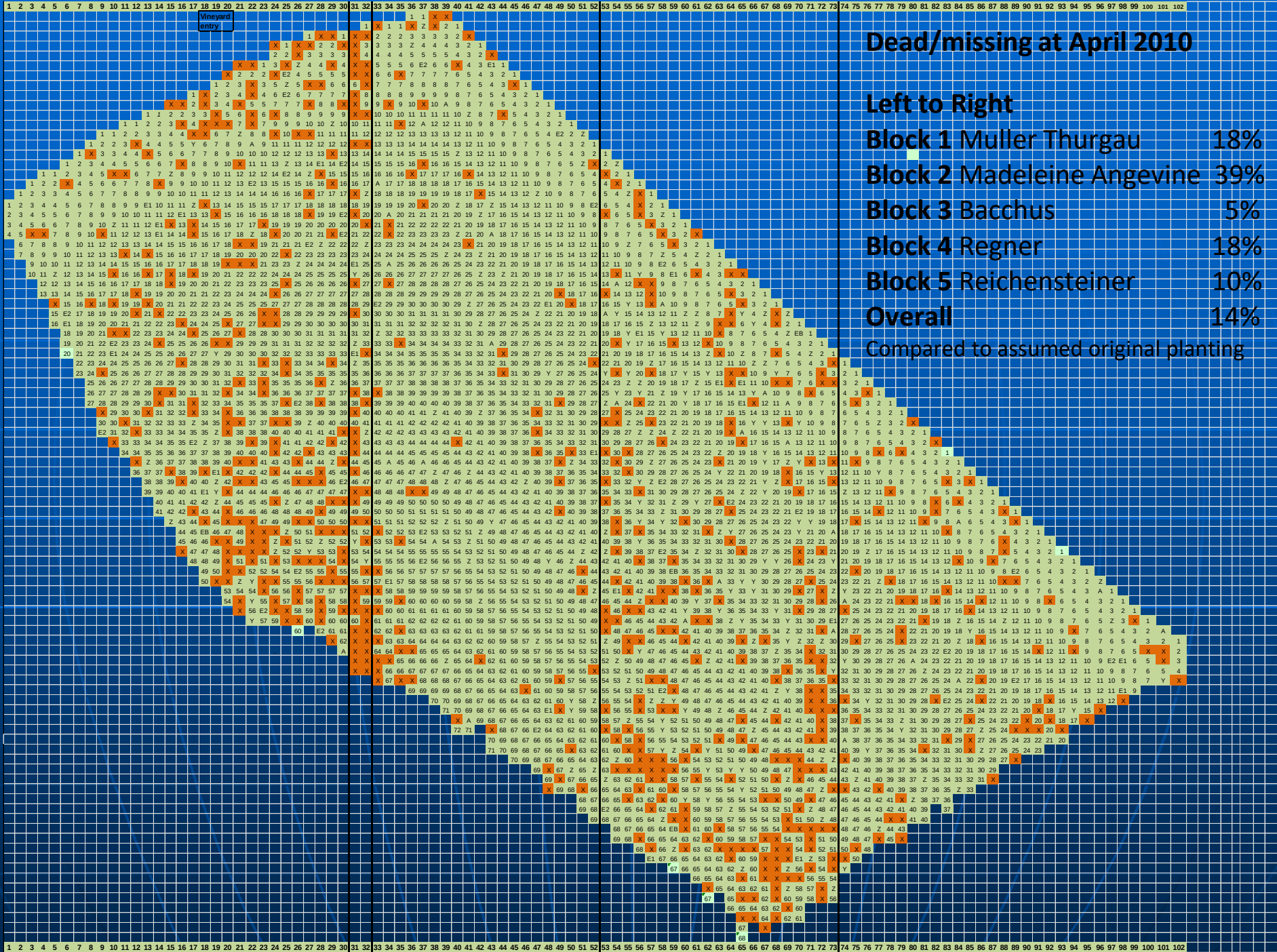
- UK, beginning January 2010
- Vineyard Chardonnay/SO4 pl. 2006
- Spring 2008 300 dead vines, replanted....
- Spring 2009 1,000 dead, replanted....
- Winter 2010, obvious “clumping”, staining from spur pruning wound, death of vine when stain arrives at graft union
- Spreads West to East, downwind
- *Bot. parva* + *Phomopsis viticola* confirmed by Government laboratory

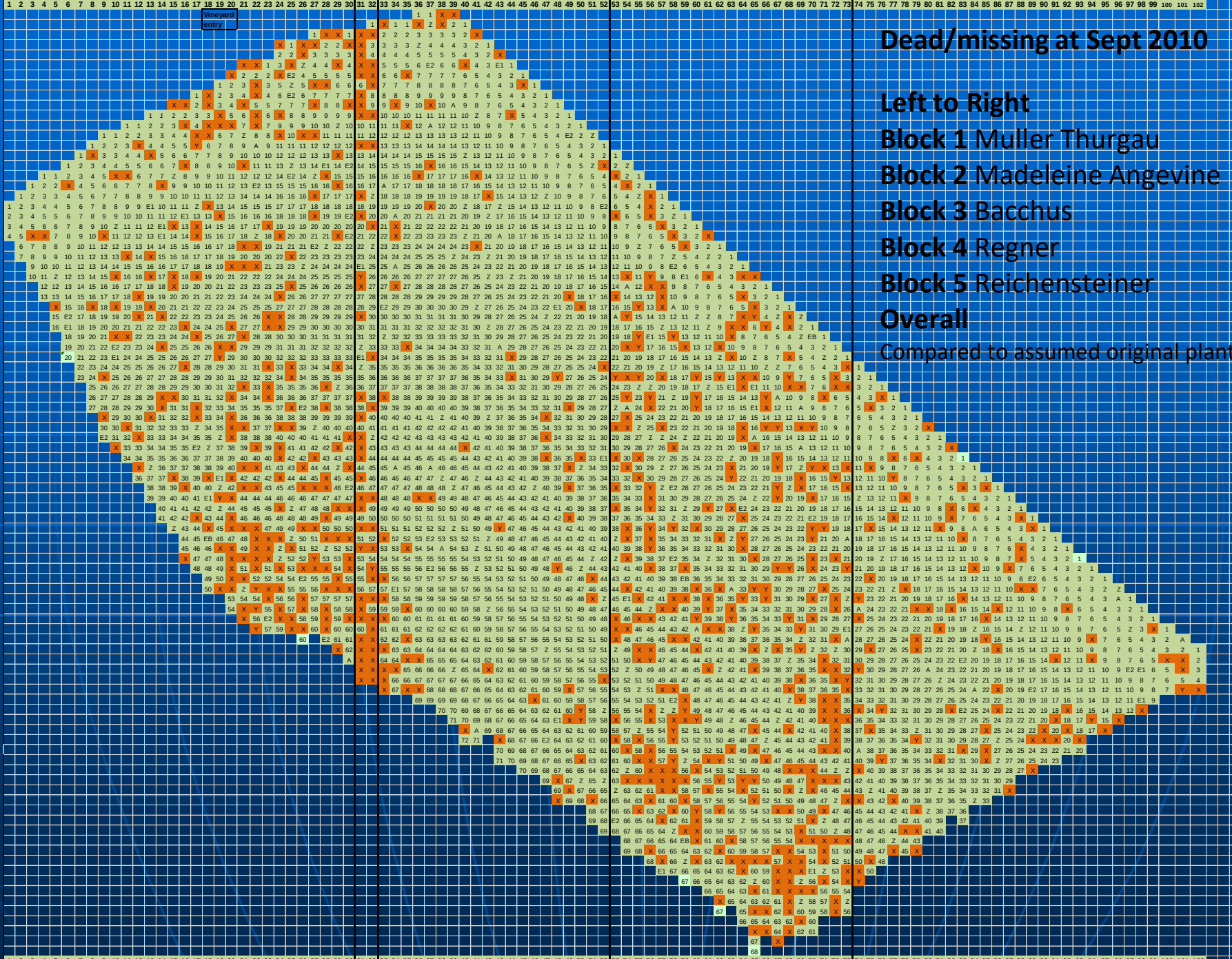
Recent Observations

Country/region	young	mature vineyards
White countries	not known before RS visit	
■ Australia	yes	yes
■ Belgium?	yes	yes
■ China (Ningxia)	yes	yes*
■ China (Hebei)	yes	yes*
■ Japan (Honsu)	yes	yes*
■ Japan (Hokkaido)	yes	yes*
■ Mexico	yes	yes
■ Myanmar	yes	yes
■ Russia	yes	yes*
■ New Zealand	yes	yes
■ Denmark	yes	yes
■ Spain	yes	yes
■ Thailand	yes	yes
■ Turkey	yes	yes
■ UK	yes	yes
■ US Midwest,	yes	yes*
■ Finger Lakes, NY	yes	yes*
■ Quebec	yes	yes

Present Global Situation

- Present in most/all grape-growing regions of the world
- Affects mature vineyards and new plantings
- Losses primarily of production, “middle aged” vineyards become un-economic
- Generally it is not recognised by growers, commonly mistaken for stress effects. This is the case in NE USA??? Winter kill???
- The problem is **insidious**, there is as yet no panic
- Maybe there should be.
- Some say it will be worse globally than phylloxera!
- I agree!!!!





Dead/missing at Sept 2010

Left to Right

Block 1 Muller Thurgau 18%

Block 2 Madeleine Angevine 41%

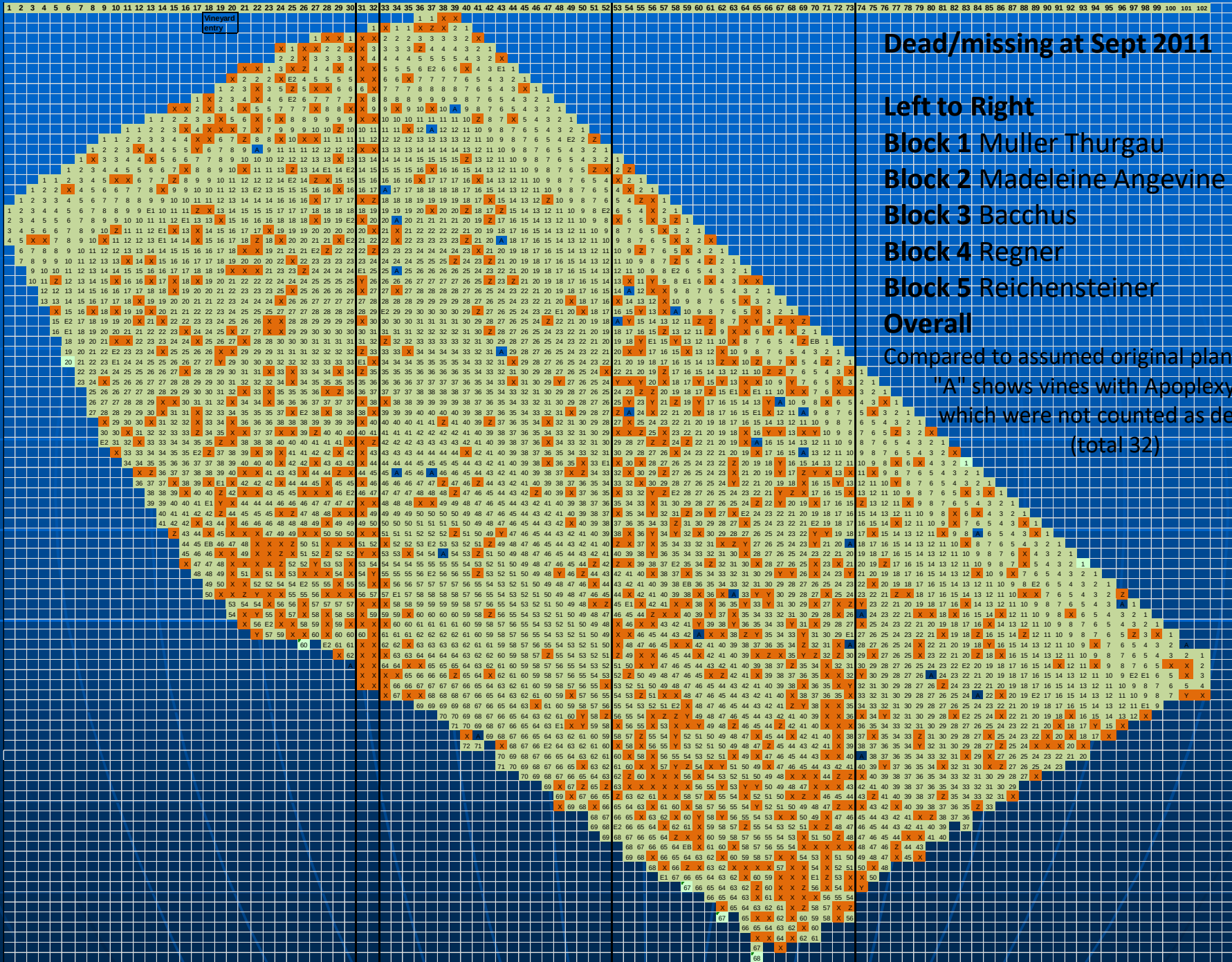
Block 3 Bacchus 6%

Block 4 Regner 23%

Block 5 Reichensteiner 11%

Overall 15%

Compared to assumed original planting



Dead/missing at Sept 2011

Left to Right

Block 1 Muller Thurgau	20%
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Block 2 Madeleine Angevine 45%

Block 3 Bacchus 8%

Block 4 Regner	28%
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Block 5 Reichensteiner 14%

Overall 19%

Compared to assumed original planting

"A" shows vines with Apoplexy, but

which were not counted as dead.

Z	3	2	X
5	4	3	2
6	5	4	3

(total 32)

[illegible][illegible][illegible]

16	15	14	13	12	11	10	9	8	7	6	X	4	3	2	1
17	16	15	14	13	12	11	10	9	8	7	X	5	4	3	2
18	17	16	15	14	13	12	X	10	9	X	7	6	5	4	3

[illegible]

22	21	X	X	18	X	16	15	14	X	12	11	10	9	8	X	6	5	4	3	2	1		
23	22	21	20	19	18	17	16	X	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
24	23	22	21	X	19	18	Z	16	15	14	Z	12	11	10	9	8	7	6	5	Z	3	X	1

25	24	X	22	21	20	19	18	Y	16	15	14	13	12	11	10	9	X	7	6	5	4	3	2	A	
26	25	X	23	22	21	20	Z	18	X	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
27	26	25	24	23	22	E2	20	19	18	17	16	15	14	X	12	11	X	9	8	7	6	5	X	X	2

28	27	26	A	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	E2	E1	6	5	X	X	3
29	28	27	26	Z	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	
30	29	28	27	26	25	24	A	22	X	20	19	E2	17	16	15	14	13	12	11	10	9	8	7	Y	X	

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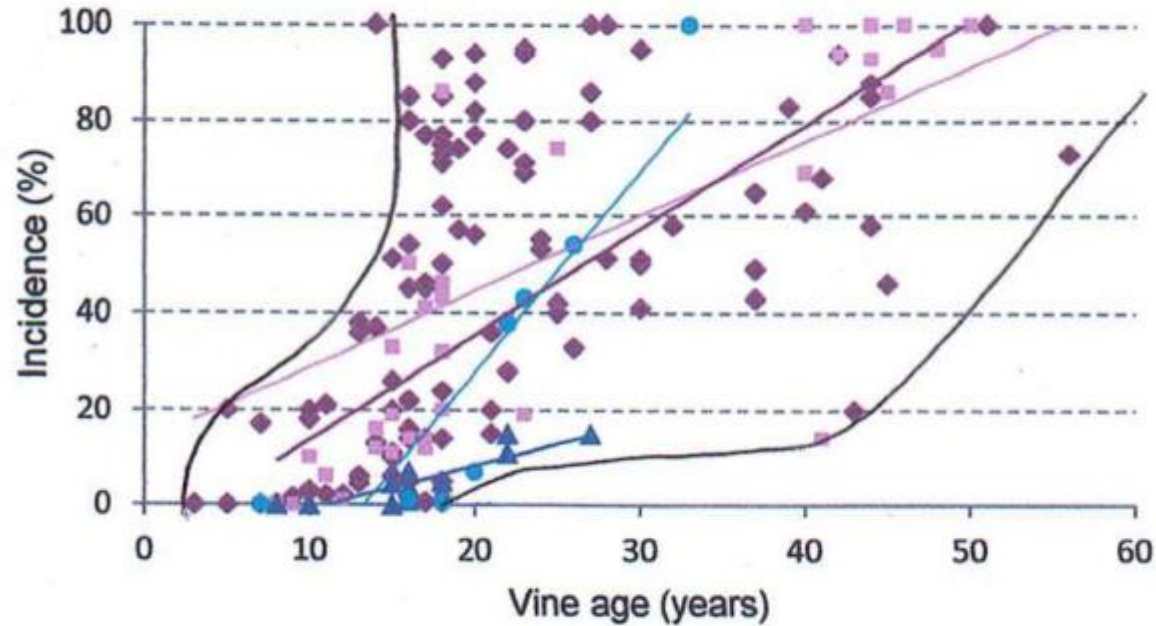
38	35	34	33	32	31	X	Z	29	X	Z	27	26	25	24	23	22	21	20
37	36	35	34	X	32	31	30	X	Z	27	26	25	24	23				
38	37	36	35	34	33	32	31	30	29	28	27	X						
39	38	37	36	35	34	33	32	31	30	29	28							

[illegible]

42	41	X	Z	38	37	36
43	42	41	40	39	37	
44	X	X	41	40		
45	44	43	42	41	40	

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Dieback



◆ Cabernet Sauvignon
 $y = 1.5613x + 13.202$
 $R^2 = 0.2633$

■ Shiraz
 $y = 2.1793x - 8.035$
 $R^2 = 0.6349$

▲ Merlot
 $y = 0.9299x - 10.355$
 $R^2 = 0.7492$

● Chardonnay
 $y = 4.1394x - 54.938$
 $R^2 = 0.7822$

Other stresses are very important

- Some TD fungi can remain as epiphytes, and do no harm to vines
- When vine is stressed, then it may not be able to tolerate epiphytes

- Common stresses are:

cold	spring frosts	-2 C
	severe winter	-25 C
	cold days?	<20 C
	cold soils???	

poor drainage*****

wind

grafting stresses when dormant

Symptoms for older vines

- Typically cannot see staining in dead wood vines.
- Spring:
 - **Failure of bud break**...looks dead, may be suckers from below
 - Very slow growth...short, yellow shoots.
- Summer-Autumn
 - **Apoplexy.** Leaves and fruit wilts, no foliage colours
 - Chlorotic foliage, single vine or so
 - reddening foliage, some red varieties ie PN
 - **VINE DEATH**

Symptoms....trunk staining and cankers, Botryosphaeria







Bench grafted vines

Nursery men are spreading trunk diseases around the world, and maybe to your vineyard



New planting, CA



Poor bud break, FLX



Bare cordon, spurs, FLX



Unprotected pruning wounds allow trunk disease infection



Unprotected pruning wounds



BOT

SOURCES OF INFECTION

By **airborne spores**, in wet weather,
during winter

- Plants ex nursery
- Other infected vines, especially nearby and up wind
- Prunings? Dead vines
- Maybe from surrounding shrubs, trees
- Generally not from soil

CONTROL OF TRUNK DISEASES

- Begin wound protection early. Year 1 pruning?
- Protect all wounds, not just large ones
- Prune spurs with long internode below cut
- Act early, at first symptom in a block..
- Begin trunk renewal, using suckers 8-12" below trunk stain
- Remove, burn prunings