

Dr Stuart Kay

Breeding update

Plant & Food
RESEARCH
RANGAHAU AHUMĀRA KAI



**Successful control of Psa
will require good orchard
management in
combination with good
cultivars.**



What's a good cultivar ?



- **Has tolerance/resistance to Psa.**
- **Has or promotes the right agronomic and consumer traits - yield, vigour, fruit quality, flower timing, pollen viability etc.**



What's a good cultivar ?



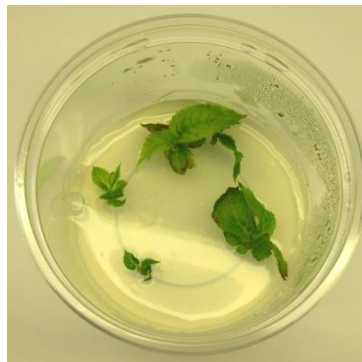
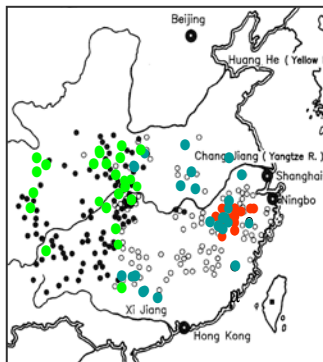
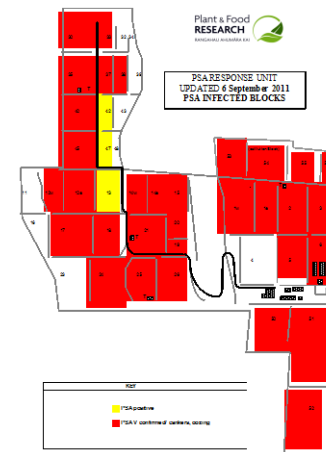
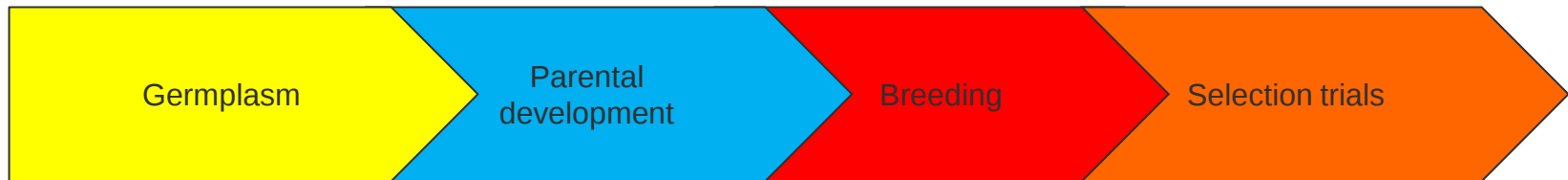
What's a good cultivar ?

- »Green fleshed kiwifruit
- »Yellow fleshed kiwifruit
- »Red-centred kiwifruit
- »'Novel' kiwifruit



How do we find/create good cultivars

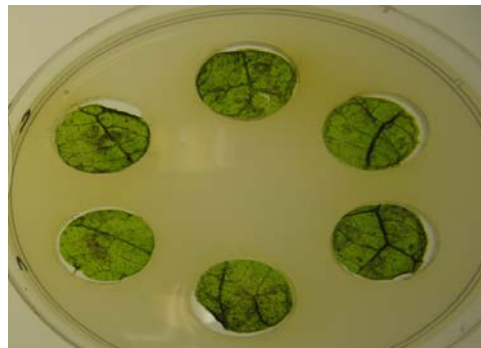
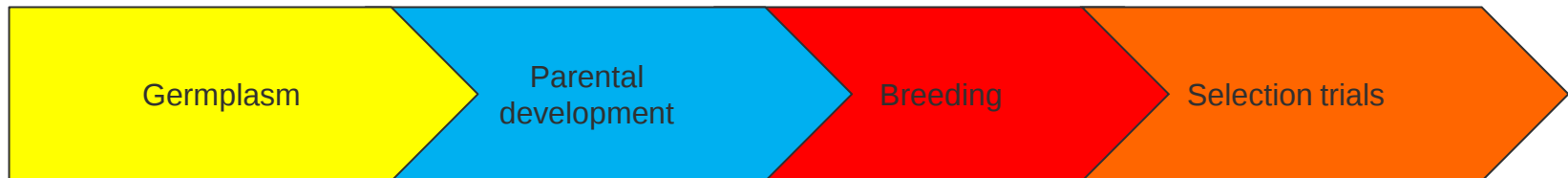
Partnership - ZESPRI, P&FR and MSI



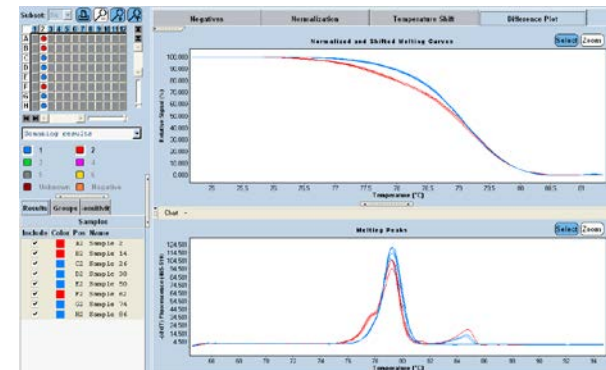
	34-04-14d		kk3-4-16a		52-06-19e		sommerville		
	0	4	0	4	0	4	0	4	
52-18-20c	46	1	48	0	45	0	46	8	0.05
52-15-05a	42	7	52	0	38	1	38	12	0.11
52-07-25f	51	3	45	3	39	9	35	20	0.17
21-13-06a	47	7	46	8	37	3	41	13	0.15
21-12-04a	48	1			18	1	29	19	0.18
	234	19	191	11	177	14	187	72	
	0.08		0.05		0.07		0.28		

How do we find/create good cultivars

Partnership - ZESPRI, P&FR and MSI



	Psa-J	Psa-K	Psa NZ-V	Psa NZ-LV
AvrRPM2				
HopAE1				
HopA1				
HopAF1				
HopH3				
HopK2				
HopAM1				
HopAV1				
HopAW1				
HopAO2				
AvrRPM1				
HopH1				
HopZ2				



What do we have ?

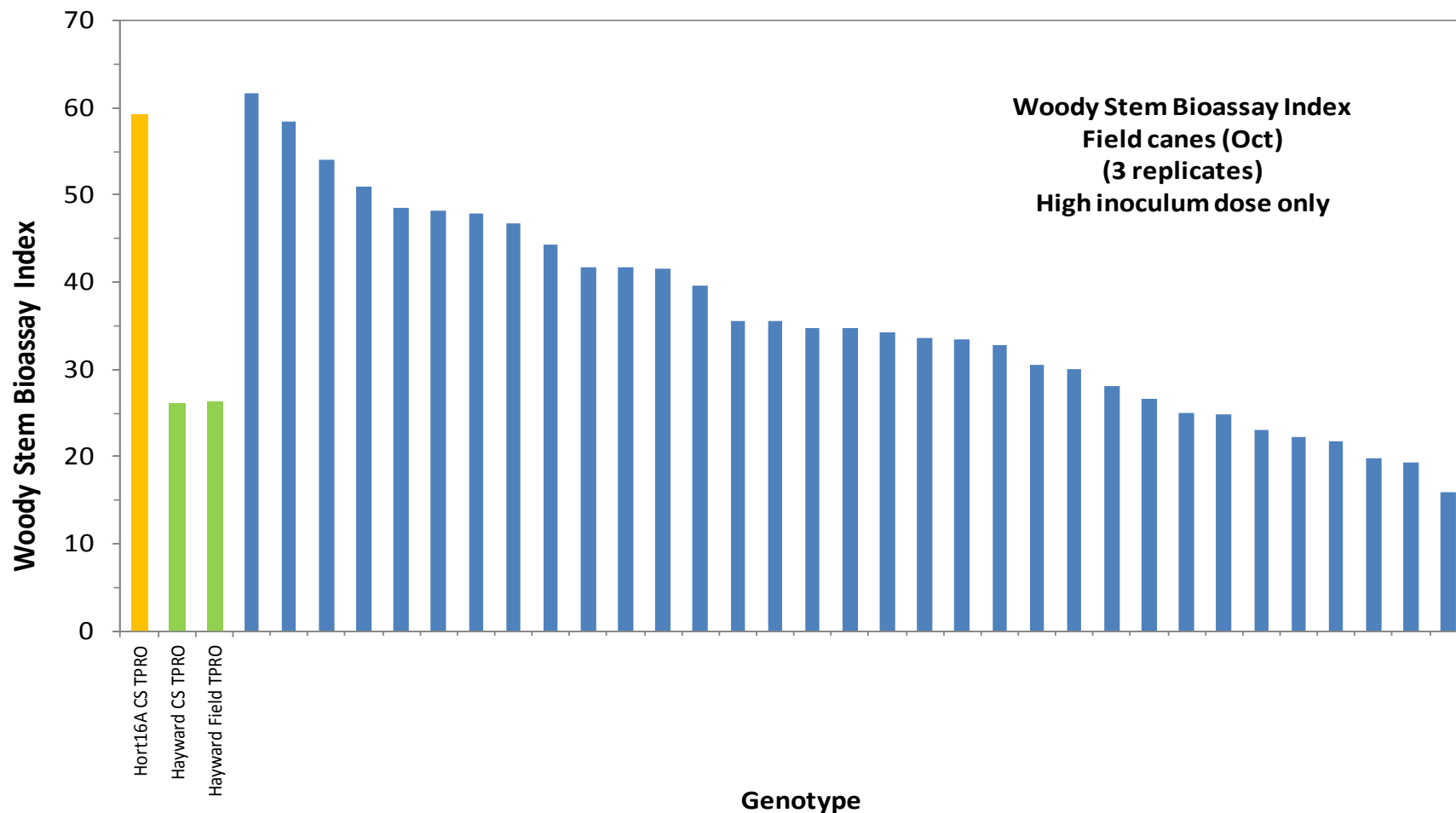


- 3 cultivars commercially released (0-2 years)
- 8 selections in pre-comm. trials (1-2 years)
- 98 selections in clonal trials (2-4 years)
- 80,000 plants in seedling blocks (4-6 years)
- New crosses (4-6 years)
- Other options (2+ years)
- Parents
- Germplasm

Female parents and germplasm - Lab



TPB2



Female parents and germplasm - Field



		2xCK				
		78	79	81	88	
2xDA	DA	0.86 47	0.86 48	0.69 45	0.67 54	0.77
	DB	0.78 49	0.72 52	0.52 39	0.99 48	0.75
	DC	0.78 54	0.74 48	0.73 48	0.92 55	0.79
	DD	0.85 54	0.81 54	0.64 41	0.77 54	0.77
	DE	0.89 49		0.7 19	0.63 48	0.74
		0.83	0.78	0.66	0.80	

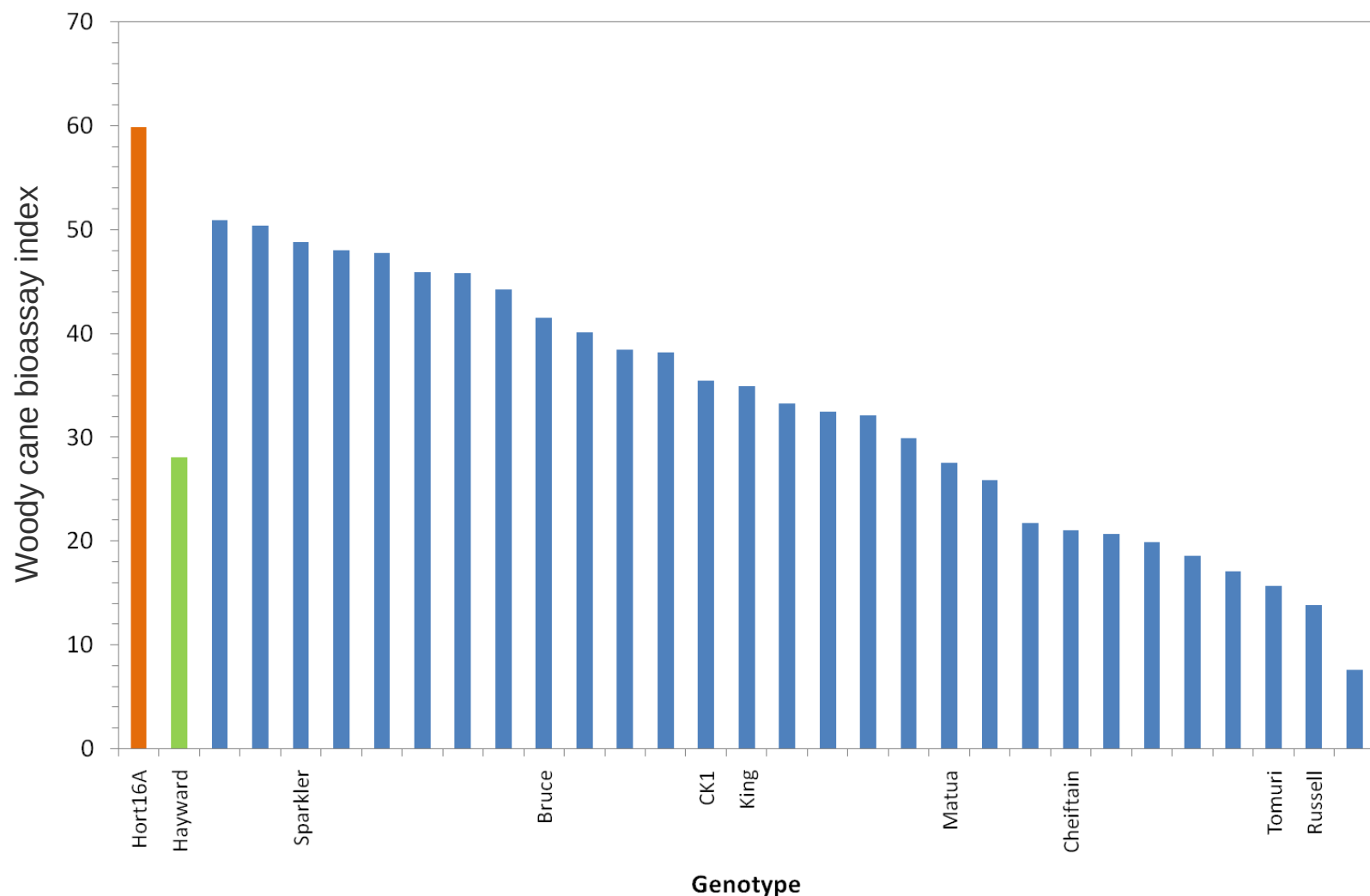
	34-04-14d		kk3-4-16a		52-06-19e		sommerville		
	0	4	0	4	0	4	0	4	
52-18-20c	46	1	48	0	45	0	48	8	0.05
52-15-05a	42	7	52	0	38	1	38	12	0.11
52-07-25f	51	3	45	3	39	9	35	20	0.17
21-13-06a	47	7	46	8	37	3	41	13	0.15
21-12-04a	48	1			18	1	29	19	0.18
	234	19	191	11	177	14	187	72	
	0.08		0.05		0.07		0.28		



Female parents and germplasm - Traits



Male parents and pollinisers - Lab



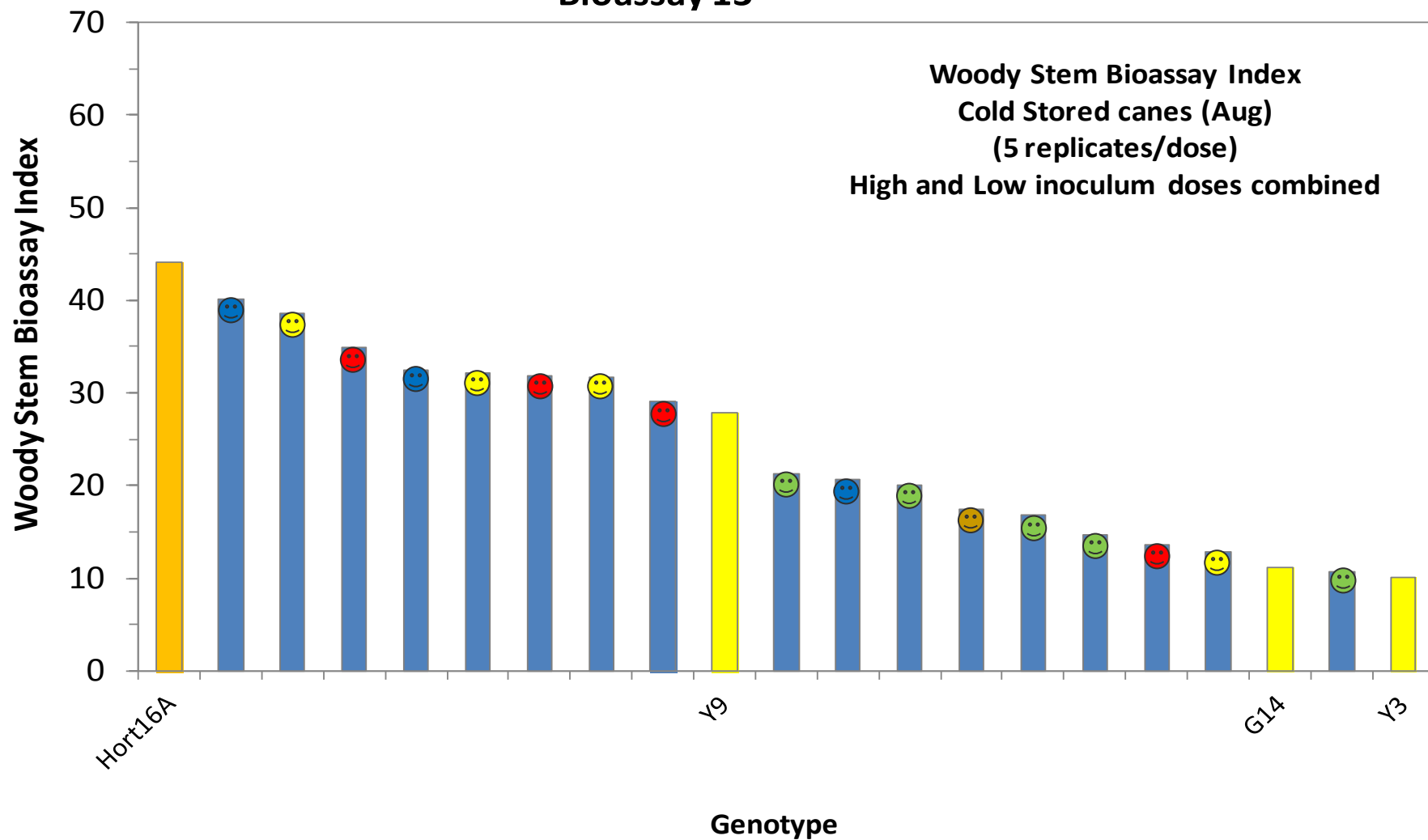
Male parents and pollinisers – Field and Traits

Sel.	Ploidy	Total Bud Break (%)	Percent Floral Bud Break (%)	BudBreak start	Flowering start	Flowering finish	King Flowers Per winter bud	Est. Total flowers per m ² of male canopy	Pollen per flower (TRC only) (mg)	Est. Pollen per m ² of male canopy (g)	Pollen viability *from previous seasons (by staining, %)	Psa score from woody cane bioassay (Hort16A = 60 Hayward = 28)	Psa Incidence at TRC Clonal trials by 31-Oct-2011 (% vines affected [total number of vines])
Bruce	2x	80 $\pm$ 5	96 $\pm$ 1	8-Sep $\pm$ 3	17-Oct $\pm$ 3	3-Nov $\pm$ 2	10.6 $\pm$ 1.4	564 $\pm$ 38	19.0	11	97	42	90 [21]
Sparkler	2x	68 $\pm$ 9	93 $\pm$ 3	11-Sep $\pm$ 2	20-Oct $\pm$ 3	4-Nov $\pm$ 2	9.8 $\pm$ 3	638 $\pm$ 171	2.2	1	98	49	85 [20]
	4x	60 $\pm$ 7	95 $\pm$ 1	16-Sep $\pm$ 2	3-Nov $\pm$ 2	17-Nov $\pm$ 2	5.3 $\pm$ 0.9	255 $\pm$ 20	2.7	1	81	38	6 [16]
	4x	77	94		22-Oct	14-Nov	17.2	894	1.2	1		40	0 [3]
	4x	69 $\pm$ 5	99 $\pm$ 0	6-Sep $\pm$ 6	24-Oct $\pm$ 5	11-Nov $\pm$ 2	9.7 $\pm$ 2.4	678 $\pm$ 88	22.6	15	96	32	0 [2]
	4x	71 $\pm$ 3	93 $\pm$ 4	5-Sep $\pm$ 2	25-Oct $\pm$ 2	12-Nov $\pm$ 3	9.2 $\pm$ 2.4	343 $\pm$ 89	1.4	0	95	44	0 [2]
	4x	64	96		22-Oct	10-Nov	16.9	985	6.5	6		22	100 [3]
	4x	69	96		16-Oct	31-Oct	14.9	1167	3.3	4		50	33 [3]
	4x	67 $\pm$ 11	101 $\pm$ 3	2-Sep $\pm$ 7	19-Oct $\pm$ 6	5-Nov $\pm$ 3	7 $\pm$ 0.6	677 $\pm$ 177	1.5	1	66	48	0 [2]
	4x	27 $\pm$ 5	10 $\pm$ 9	19-Sep $\pm$ 5	7-Nov		0	0				26	0 [4]
	4x	14 $\pm$ 1	45 $\pm$ 18		10-Nov $\pm$ 4	14-Nov	0.8 $\pm$ 0.4	103 $\pm$ 81				46	0 [3]
Chieftain	6x	50 $\pm$ 5	94 $\pm$ 2	6-Oct $\pm$ 8	17-Nov $\pm$ 1	1-Dec $\pm$ 3	4.7 $\pm$ 1.3	180 $\pm$ 39	12.5	2	95	21	0 [11]
King	6x	58 $\pm$ 8	85 $\pm$ 5	17-Sep $\pm$ 3	3-Nov $\pm$ 2	22-Nov $\pm$ 1	3.2 $\pm$ 1	129 $\pm$ 23	2.7	0	89	35	0 [13]
	6x	48 $\pm$ 10	86 $\pm$ 4	22-Sep $\pm$ 1	14-Nov $\pm$ 2	30-Nov $\pm$ 1	6.2 $\pm$ 1.4	263 $\pm$ 53	11.4	3	97-98	30	0 [3]
	6x	54 $\pm$ 11	99 $\pm$ 1	21-Sep $\pm$ 2	13-Nov $\pm$ 0	27-Nov $\pm$ 1	7.8 $\pm$ 2.9	324 $\pm$ 84	16.3	5	96-97	20	0 [2]
	6x	60 $\pm$ 10	100 $\pm$ 0	19-Sep $\pm$ 3	9-Nov $\pm$ 1	22-Nov $\pm$ 1	9.3 $\pm$ 2.8	391 $\pm$ 34	1.5	1	46	8	0 [2]
	6x	52 $\pm$ 13	93 $\pm$ 0	20-Sep $\pm$ 4	11-Nov $\pm$ 3	26-Nov $\pm$ 2	10.3 $\pm$ 3.7	459 $\pm$ 83	9.0	19	98-99	19	0 [2]
	6x	53 $\pm$ 18	102 $\pm$ 3	27-Sep $\pm$ 3	20-Nov $\pm$ 1	5-Dec $\pm$ 0	17.2 $\pm$ 8.5	674 $\pm$ 104	4.5	3	7	46	0 [2]
	6x	37	74		12-Nov	22-Nov	3	154	1.5	0		32	0 [3]
	6x	55	86		12-Nov	23-Nov	6.2	285	0.4	0		33	0 [3]
	6x	75	96		5-Nov	19-Nov	12.4	631	0.4	0	96	51	0 [3]
	6x	52	94		10-Nov	22-Nov	9	337	3.5	1	100	17	0 [3]
	6x	58	93		15-Nov	23-Nov	7.7	554	2.3	1	97	38	0 [3]
	6x	28	93		11-Nov	24-Nov	7.7	331	4.0	1	99	48	0 [3]

Cultivars - Lab



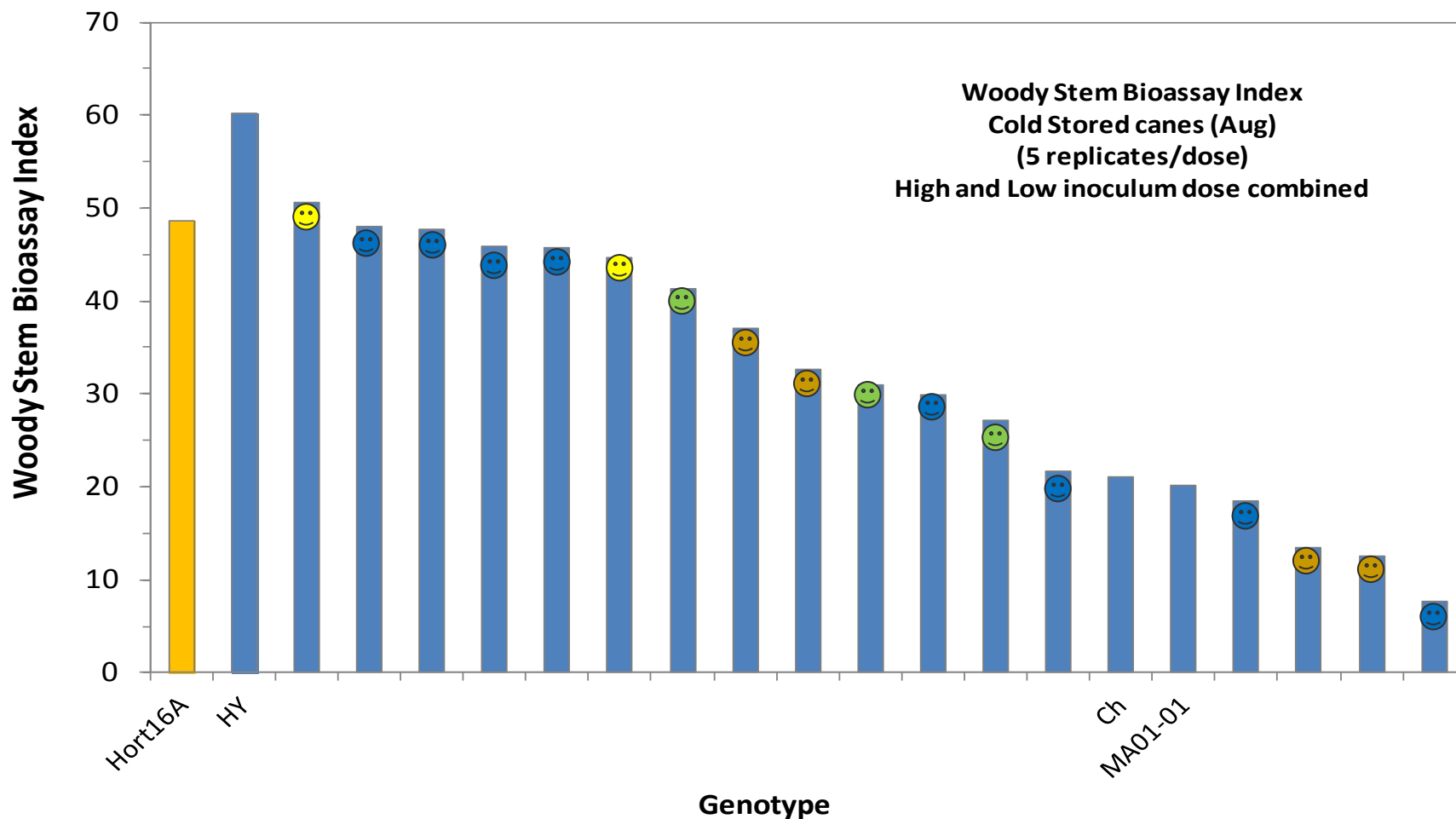
Bioassay 13



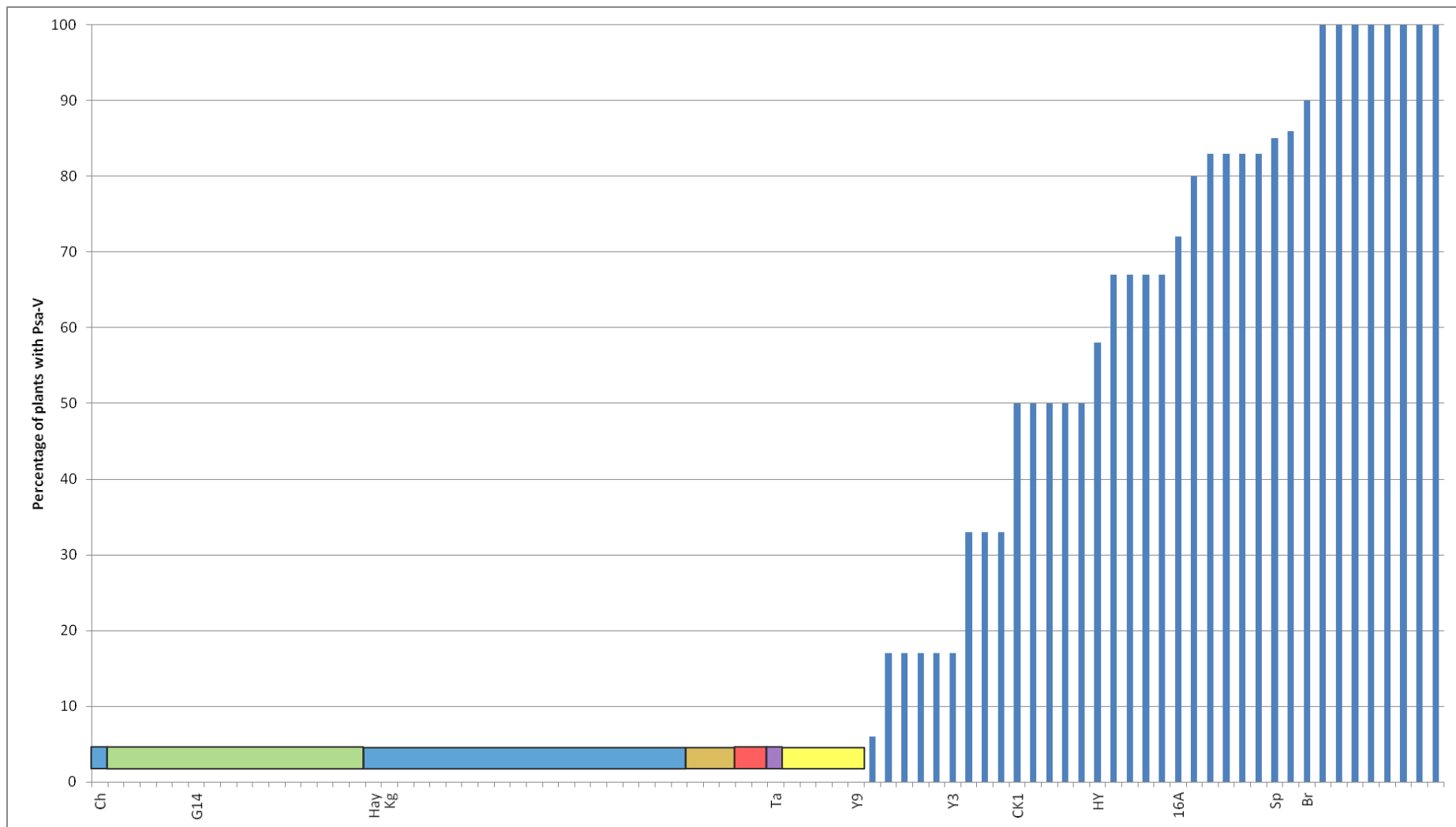
Cultivars - Lab



Bioassay 14



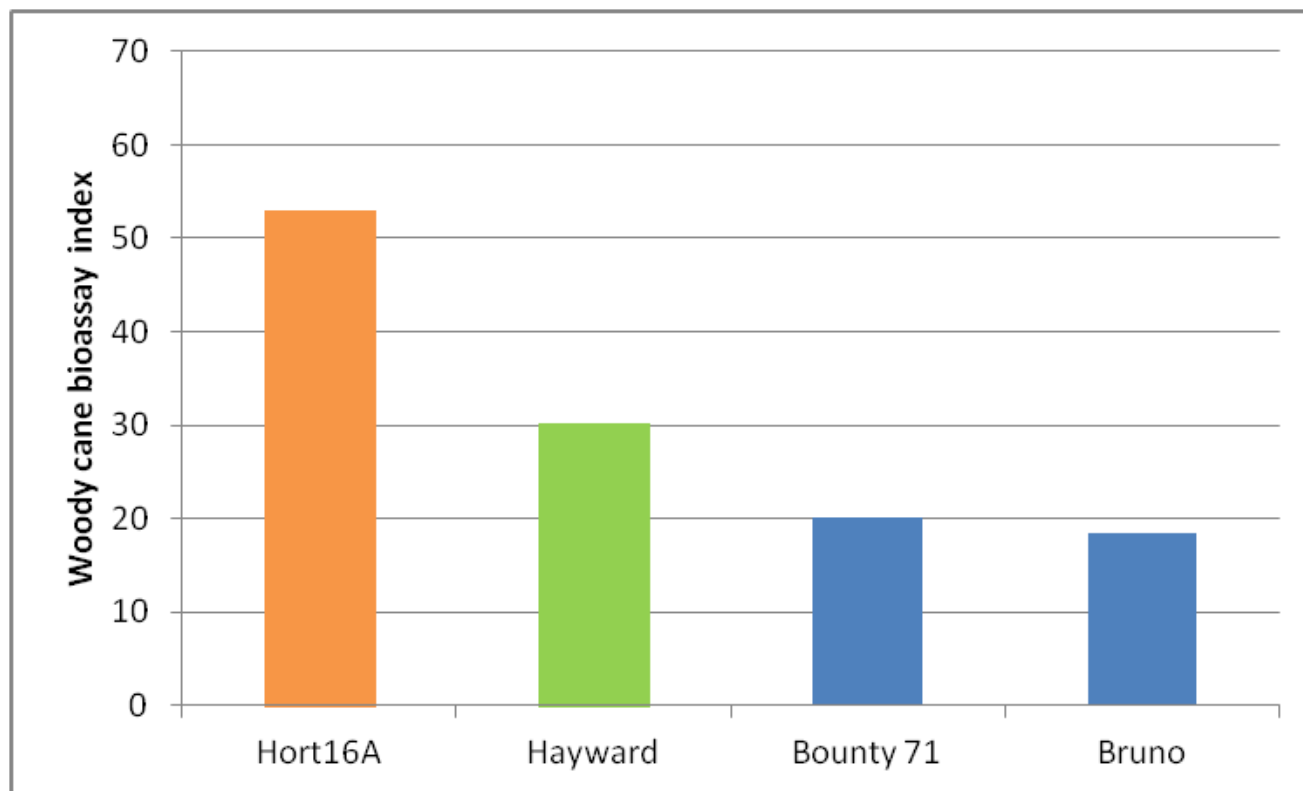
Cultivars and males - Field



Cultivars - Traits



Rootstocks - Lab



Rootstocks - Field



Percentage of vines showing secondary symptoms of PsA-V infection, including cankers (red/orange exudate) and or secondary symptoms (shoot dieback, leaf spotting)

Block	Scion cultivar	Scion age (from graft)	Rootstock clone	Rootstock age (from planting)	Location of PsA-V symptoms	
					Above graft	Below graft
GOLD	Hort16A	3	Bounty 71	4	88	0
	Hort16A	3	Bruno sdg	4	100	0
	Hort16A	3	Hort16A	4	88	38
	Hort16A	3		4	50	0
	Hort16A	3		4	75	0
	Hort16A	3		4	88	0
	Hort16A	3		4	88	0
Male	Bruce	2	Deliciosa (?)	4	91	0
	Meteor	2	Deliciosa (?)	4	78	0

Rootstocks - Traits



Hort16A scion

Stock	Yield	Fresh weight	Brix	DM	Flesh colour
Bounty 71	47.4	93.9	15.66	19.34	100
Puk Dwf	43.8	85.4	14.3	18.59	102.3
	42.2	85.4	7.95	16.81	103.9
Kaimai	39.5	82.6	13.63	17.78	103.1
	38.7	83.2	12.62	17.52	104.5
	38.1	90.1	7.64	16.4	105.3
Hort16A	37.5	82.8	7.92	16.26	103.8
	36.4	86.5	7.85	16.76	104.9
Hayward	36	86.7	7.48	16.28	106.1
	34.4	80.5	7.94	16.77	104
	28.7	75.7	7.62	16.47	105
	10	75.6	7.82	15.84	104.8

Rootstocks - Traits



Hayward scion

	Yield	Fresh weight	Brix	DM
	43.6	104.2	6.15	16.89
	43.2	94.4	6.83	17.61
	40.6	97	6.89	17.54
	37.2	100.4	6.05	17.25
	36.9	101.2	6.47	17.02
Hayward	35.2	98.4	6.77	17.39
	35	99.9	7.08	17.73
Puk Dwf	34.3	97.4	6.97	17.5
Kaimai	31.2	105.5	7.06	17.42
	29.3	94.8	7.01	17.54
Bounty 71	26.9	105.1	5.96	17.4
	13.8	92.7	7.16	17.55



What's a good cultivar ?

How find/create good cultivars ?

What do we have ?





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