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RESEARCH

RANGAHAU AHUMĀRA KAI



Progression of Psa in the orchard

Ian Horner and Mike Manning



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Orchard Progression – Key questions 2010/11

- » Does Psa spread within the canopy during the season, and if so, when?
- » What is the pattern of spread?
- » Do leaf symptoms progress to cane/trunk symptoms?
- » How will next season's disease relate to the current season?
- » Does aggressive containment work?

Orchard Progression – Approach 2010/11

- 15 monitored orchards, commenced Dec 2010
- Hayward & Hort16A. Psa-V and Psa-Lv
- Te Puke (11), Hawkes Bay (2), Motueka (2)
- Monitored monthly

Detailed repeat assessments of bays, canes, shoots, leaves

Summary 2010/11

- » No secondary symptoms in orchards with Low-V strain
- » No secondary symptoms in 'Hayward' with V-strain
- » Increase in the number of leaves showing Psa leaf spot symptoms throughout the season.
 - » Both Hort16A & Hayward
 - » Both V & Lv strain (greater increase in V-strain orchards)
- » **Psa remains active throughout summer in NZ**

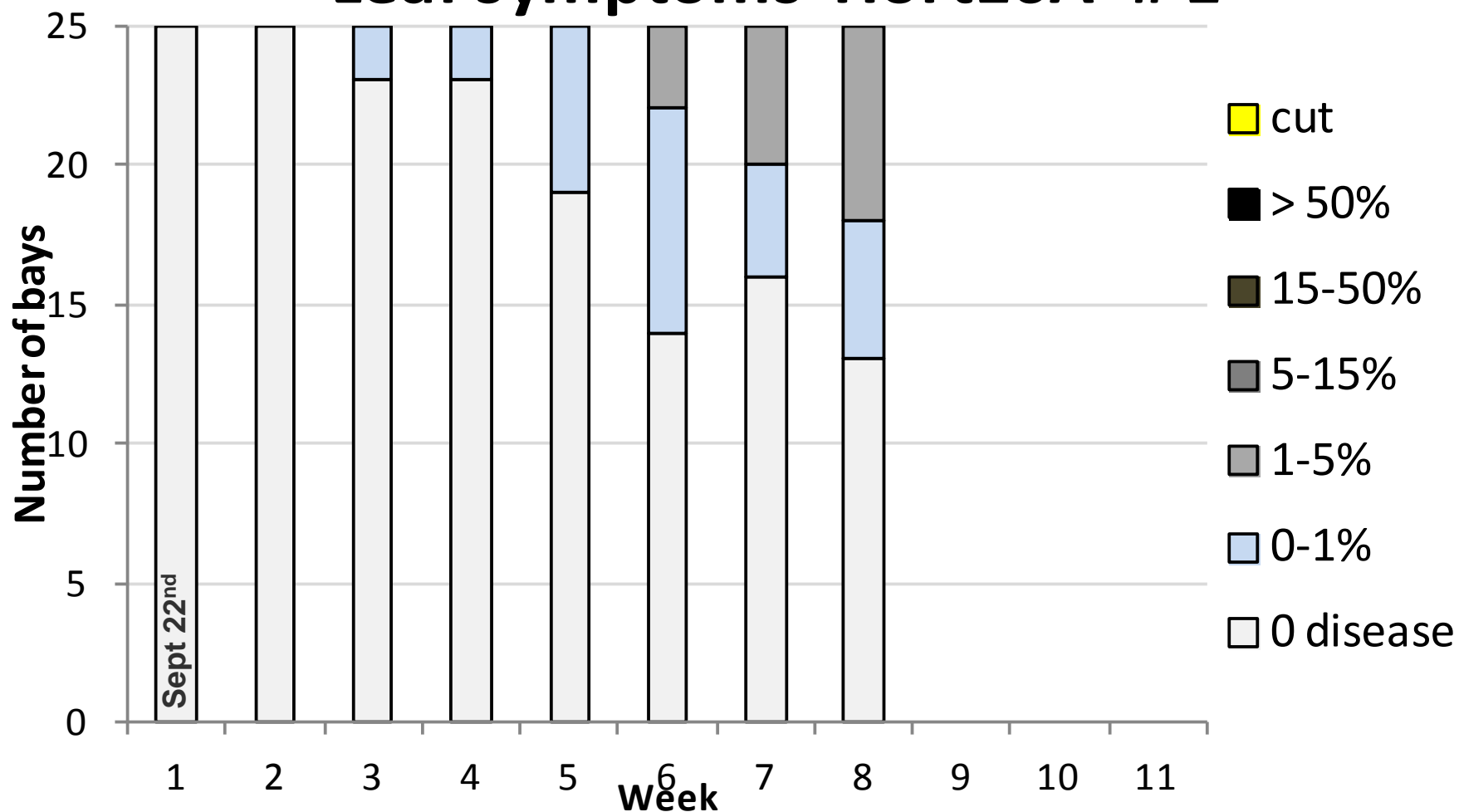
2011/12

- » 3 'Hayward', 3 'Hort16A' orchards, all in Te Puke region
- » All Psa-V (Hort16A orchards were all low-V last season)
- » Weekly assessments, emphasis on Spring
- » 25 bays (leaf & 2^o symptoms)
- » 30 canes, detailed mapping of shoots
- » 30 shoots, detailed mapping of leaves

- » Following epidemic development, collecting hard data
- » Relate to weather, management factors etc.

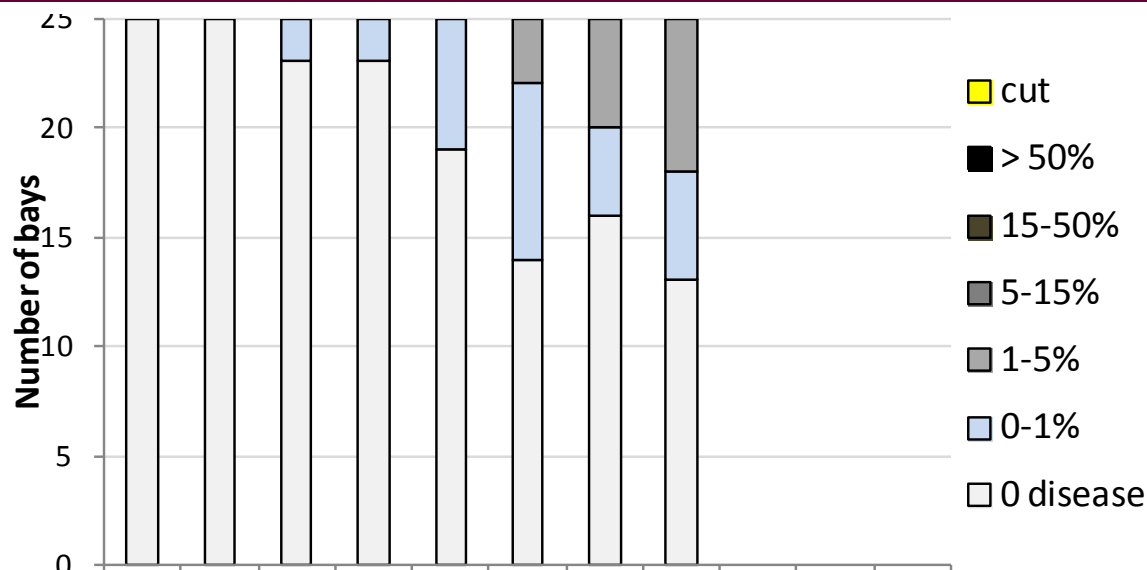
'Hort16A' Orchard 1

Leaf symptoms 'Hort16A' # 1

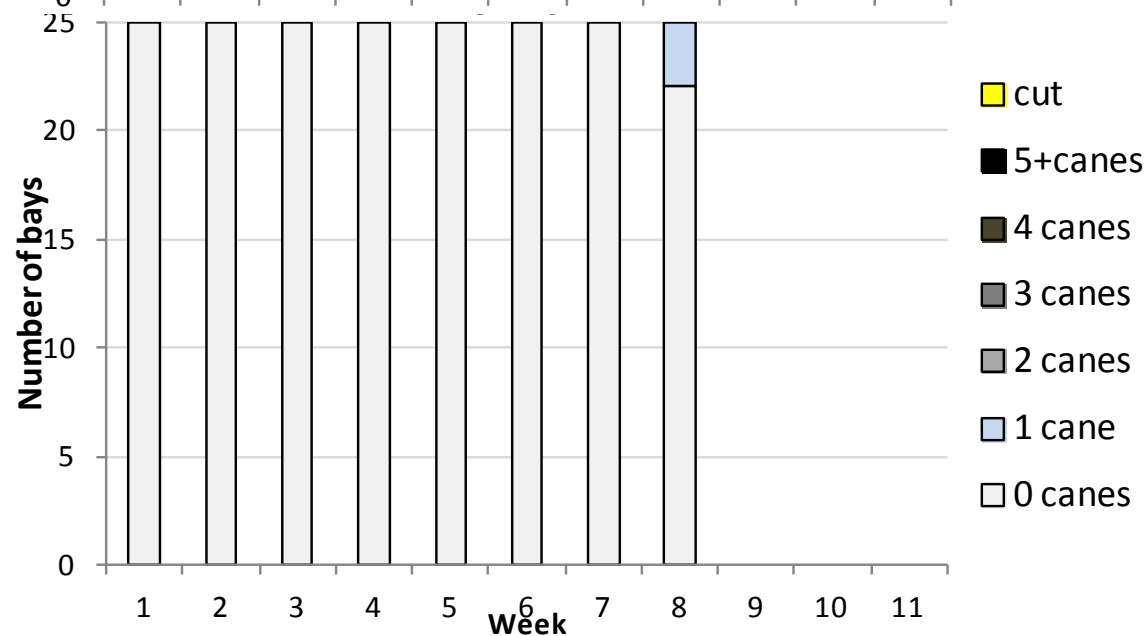


'Hort16A' Orchard 1

» Leaf symptoms
(bay score)

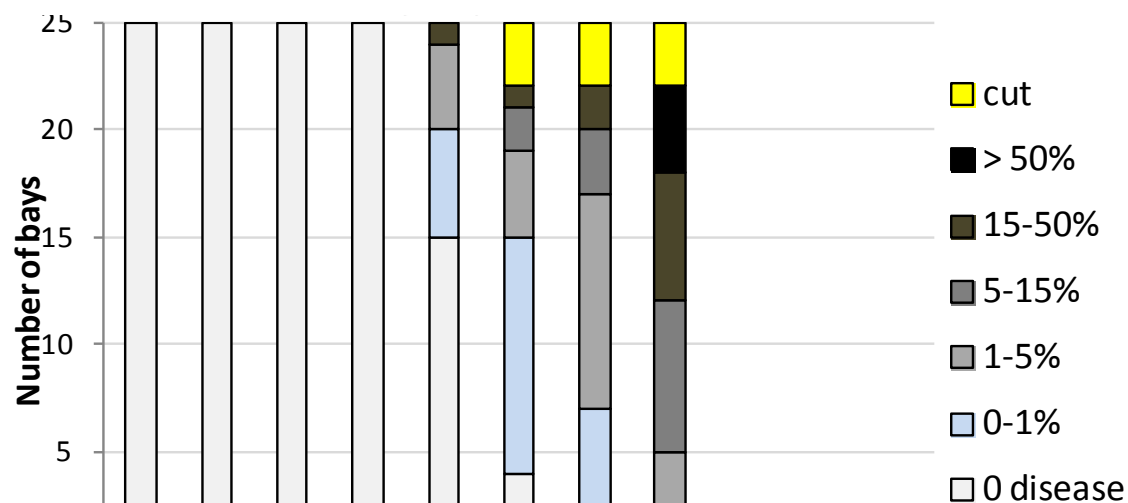


» Wilt/dieback
(canes/bay)

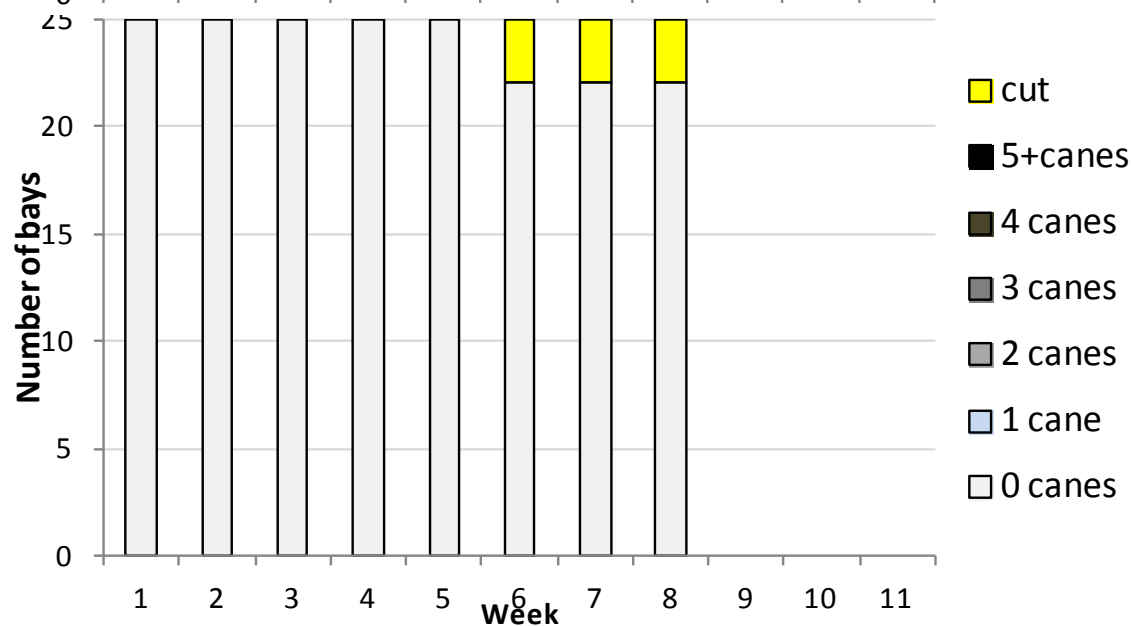


'Hort16A' Orchard 2

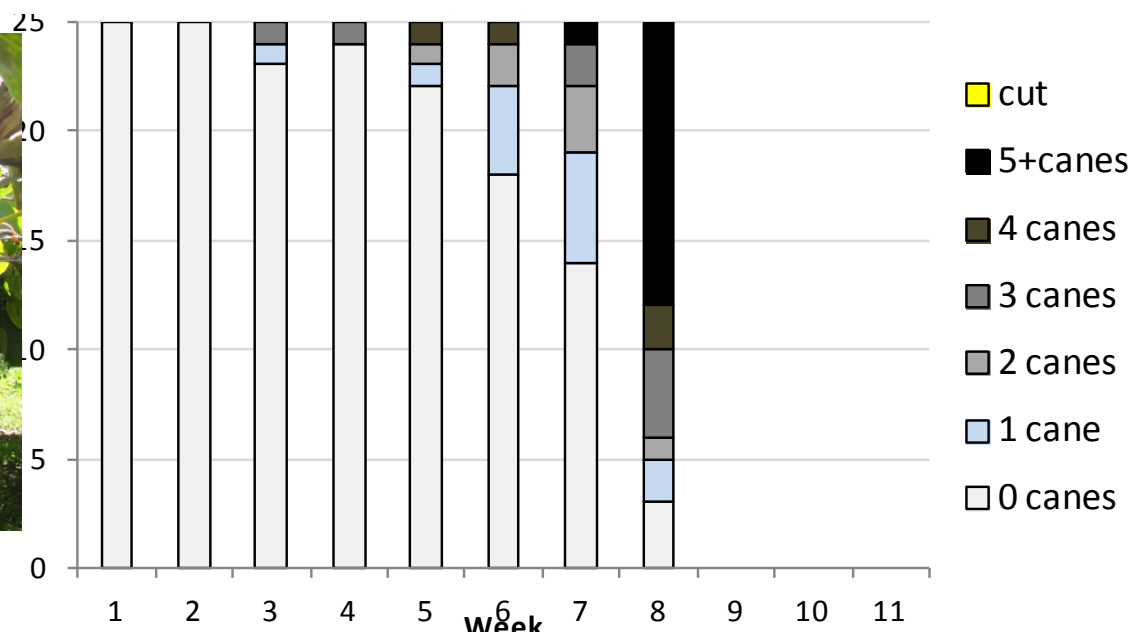
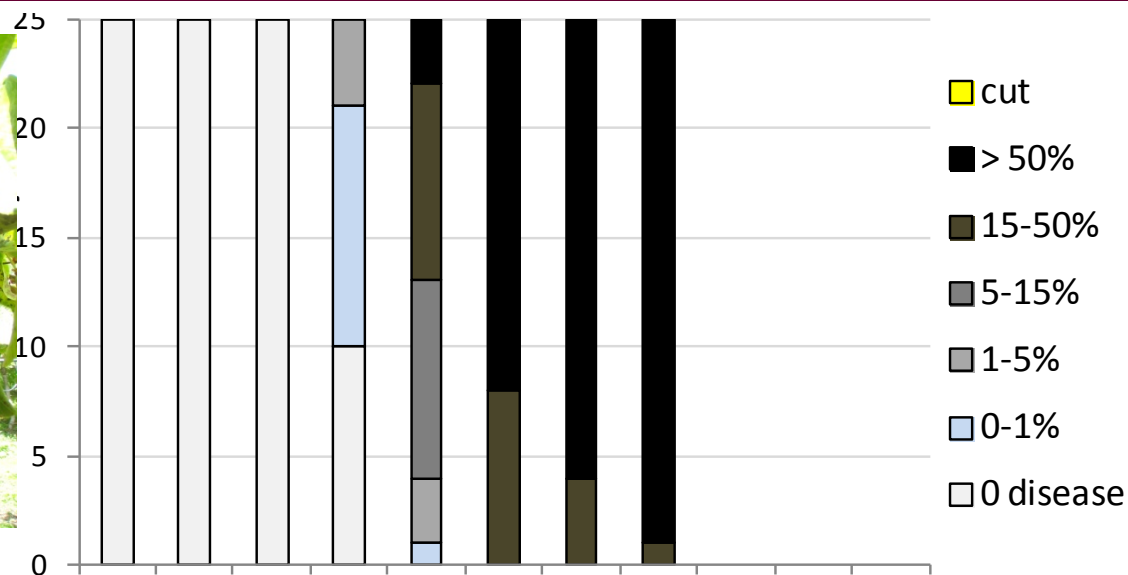
» Leaf symptoms
(bay score)



» Wilt/dieback
(canes/bay)

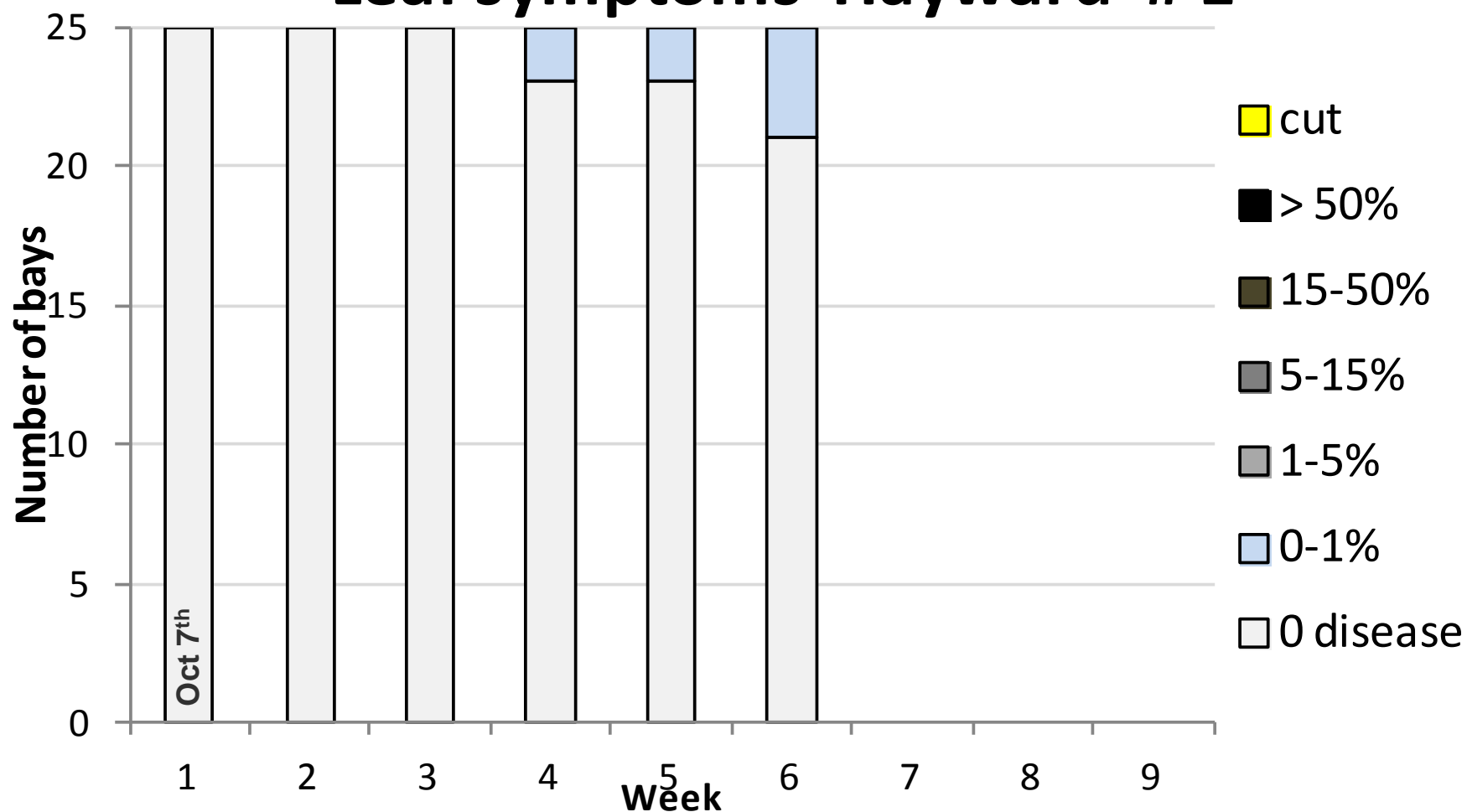


'Hort16A' Orchard 3



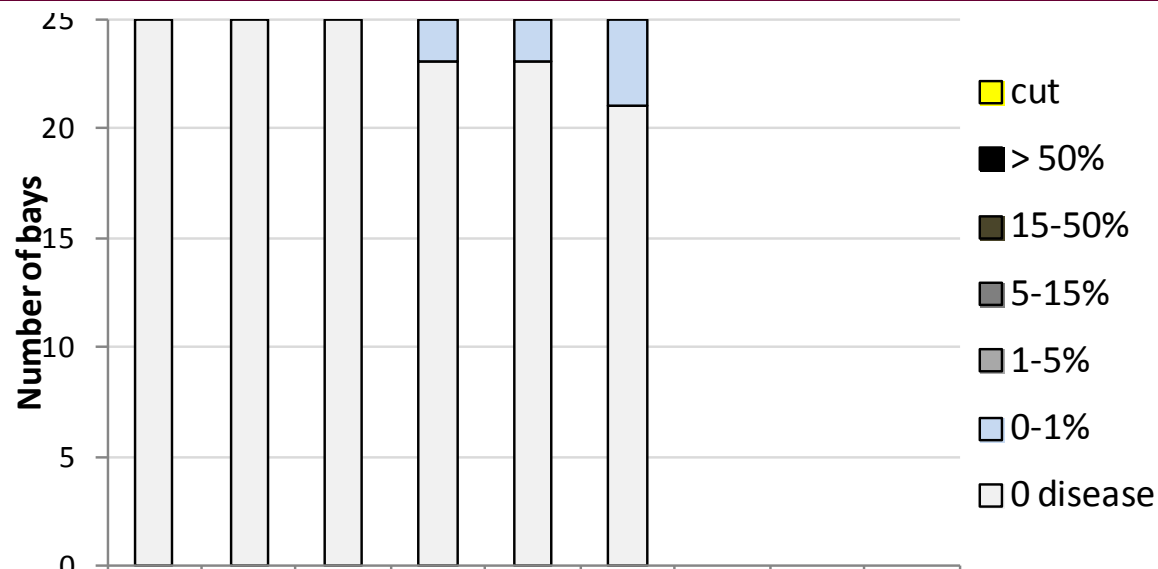
'Hayward' Orchard 1

Leaf symptoms 'Hayward' # 1

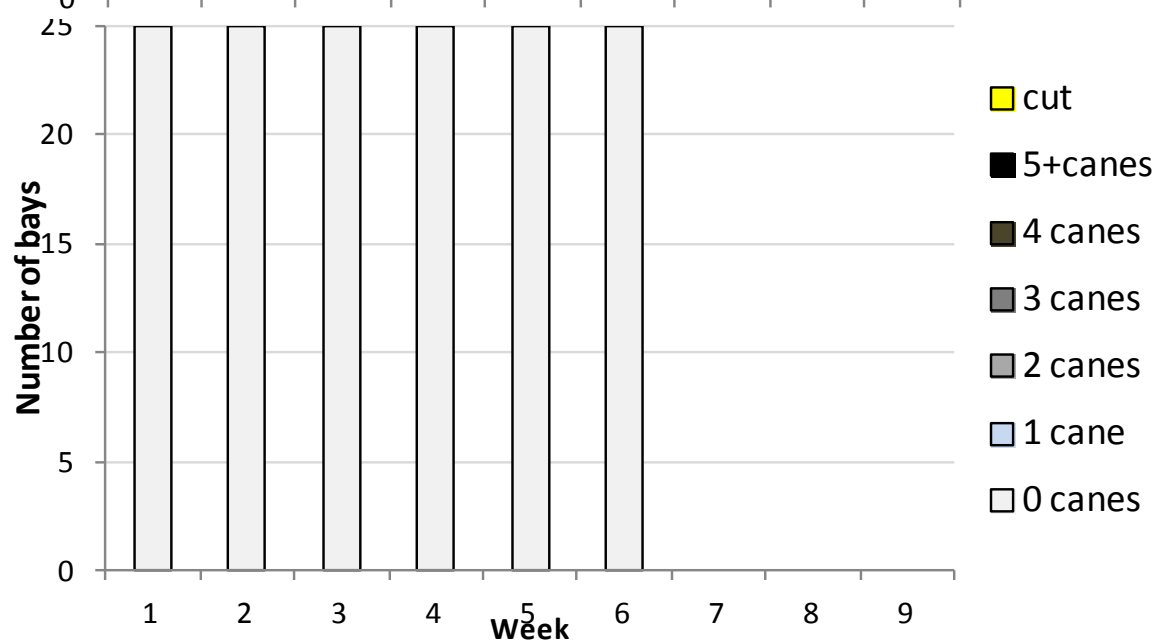


'Hayward' Orchard 1

» Leaf symptoms
(bay score)

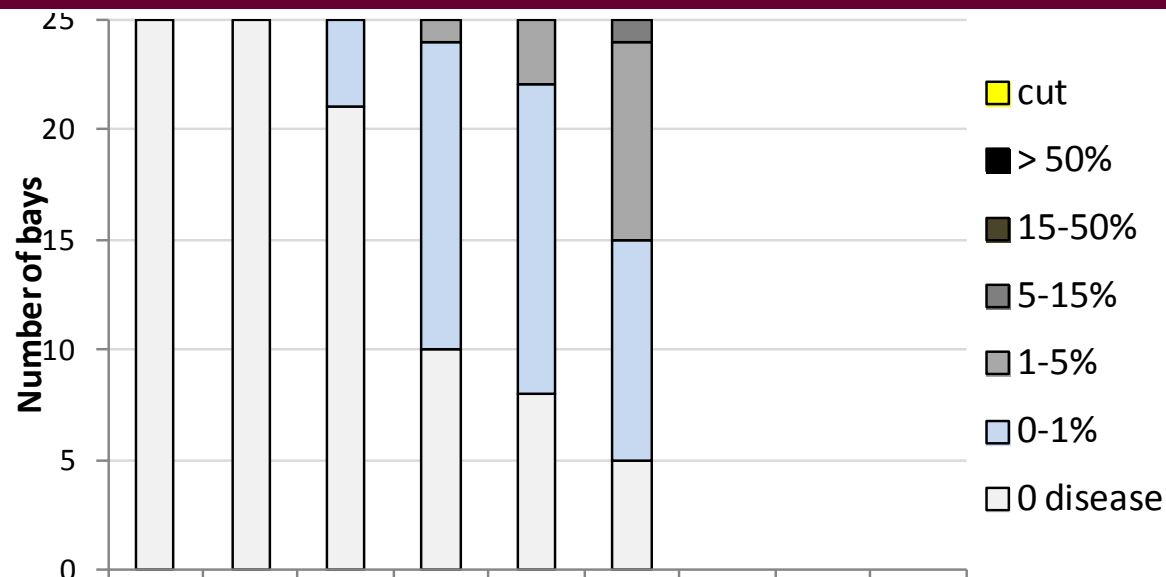


» Wilt/dieback
(canes/bay)

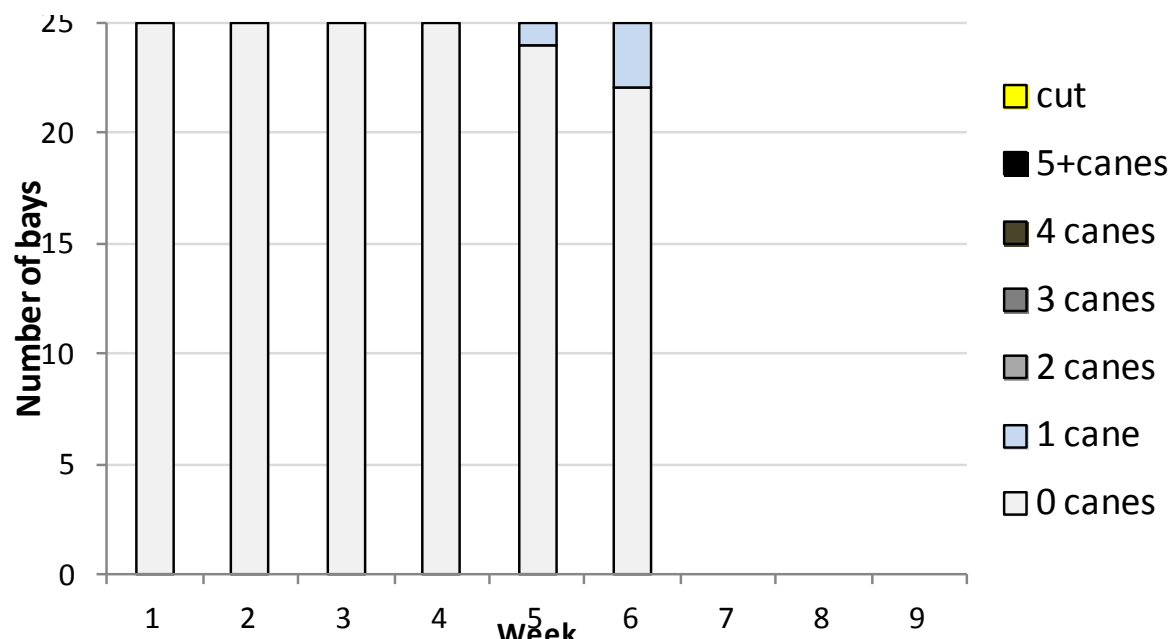


'Hayward' Orchard 2

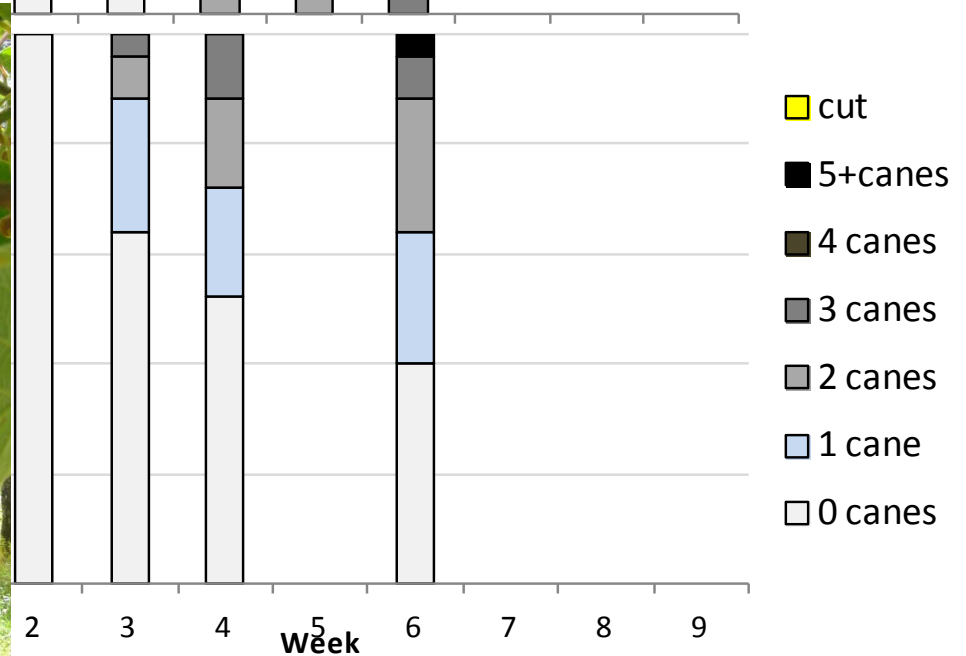
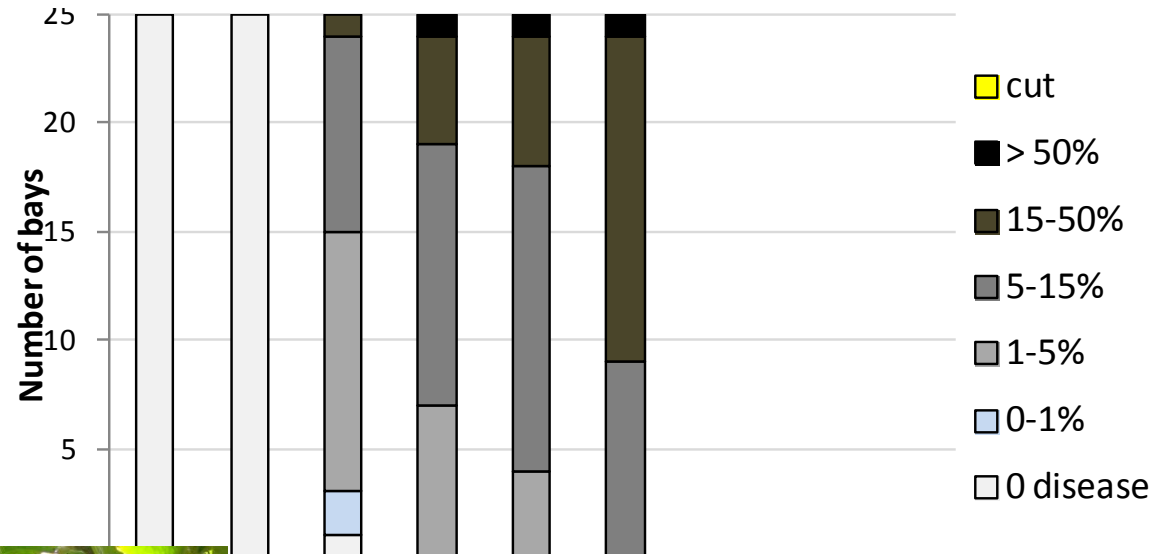
» Leaf symptoms
(bay score)



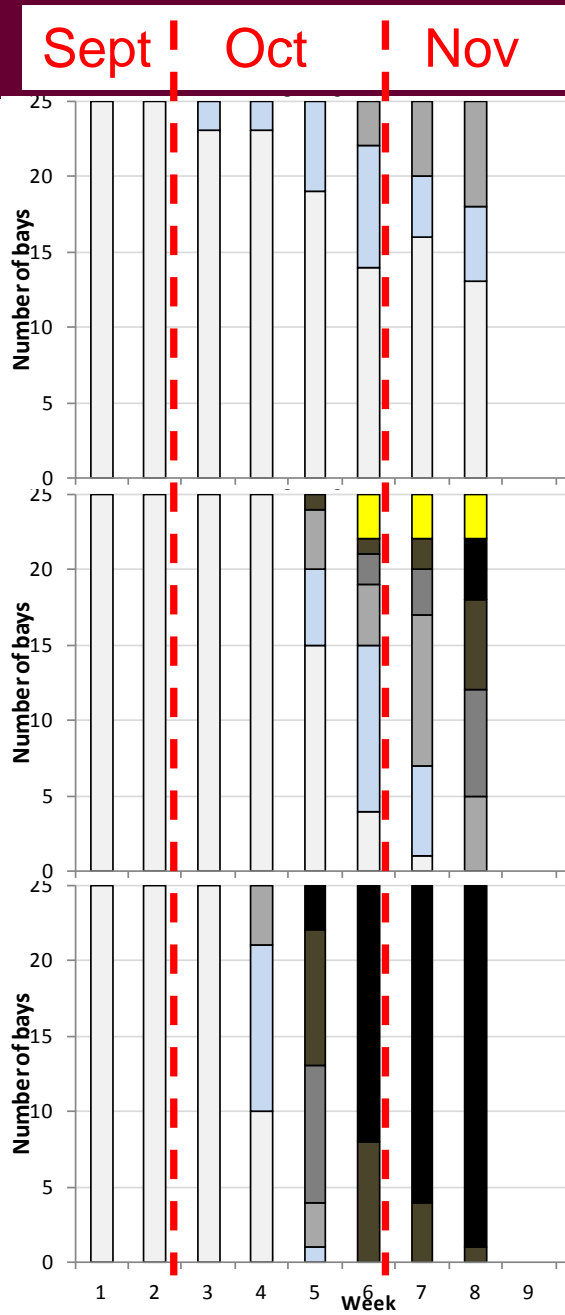
» Wilt/dieback
(canes/bay)



'Hayward' Orchard 3



'Hort 16A'

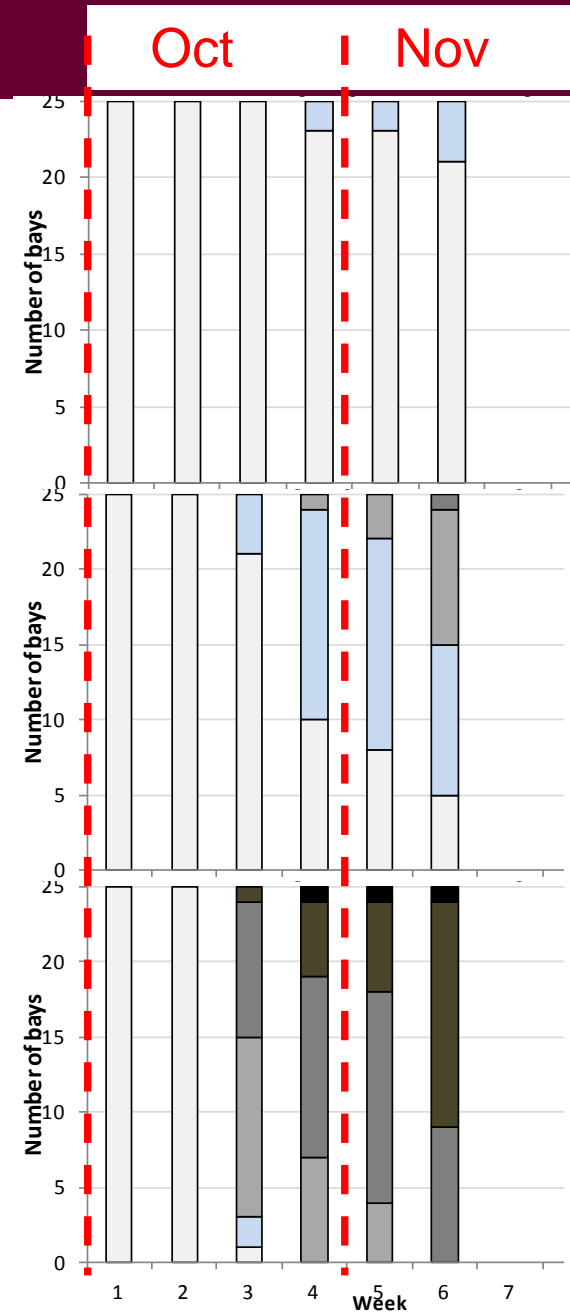


» Symptom expression
mid October

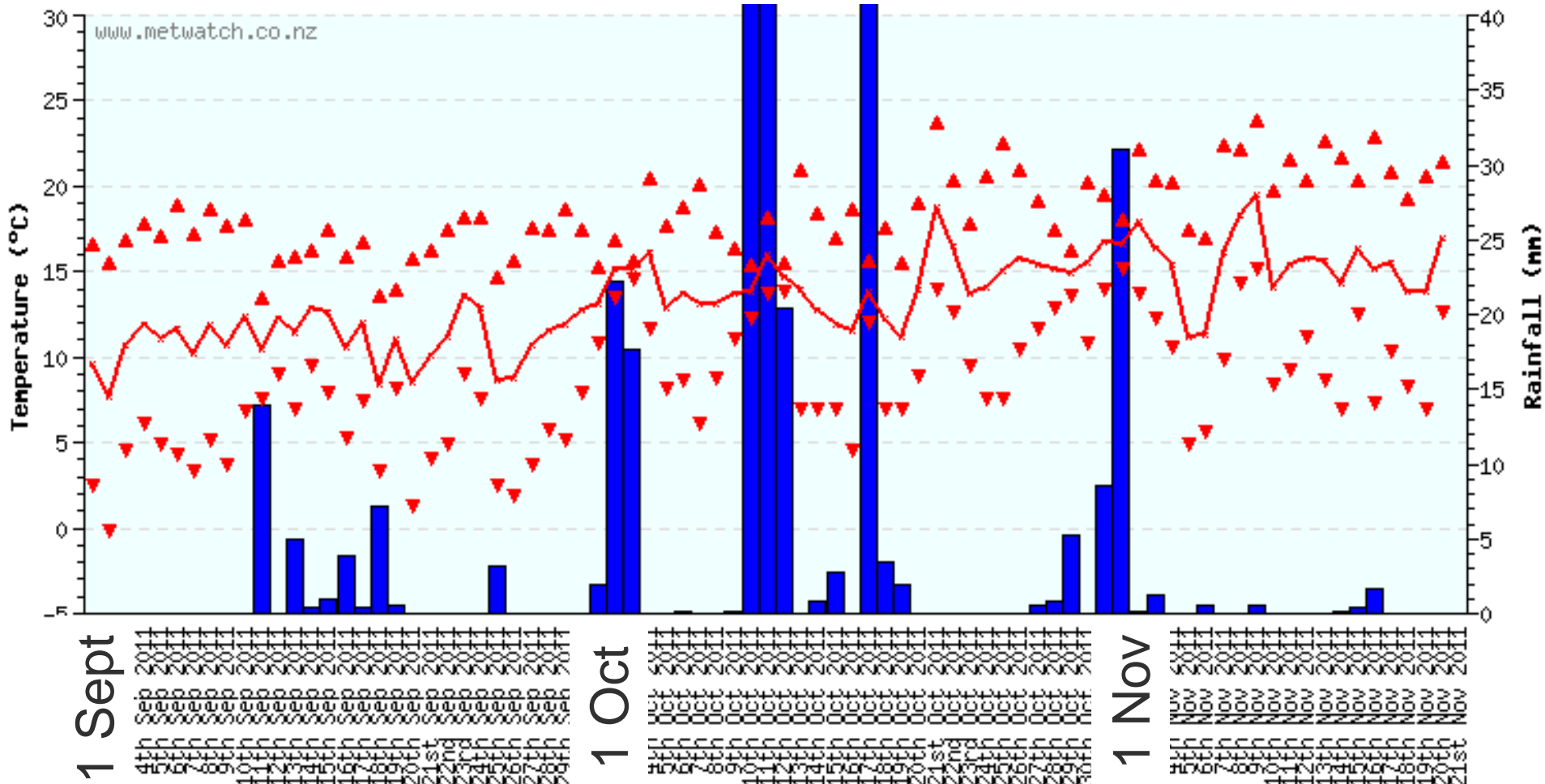
Shoots 5-30 cm long

7 – 10 leaves per shoot

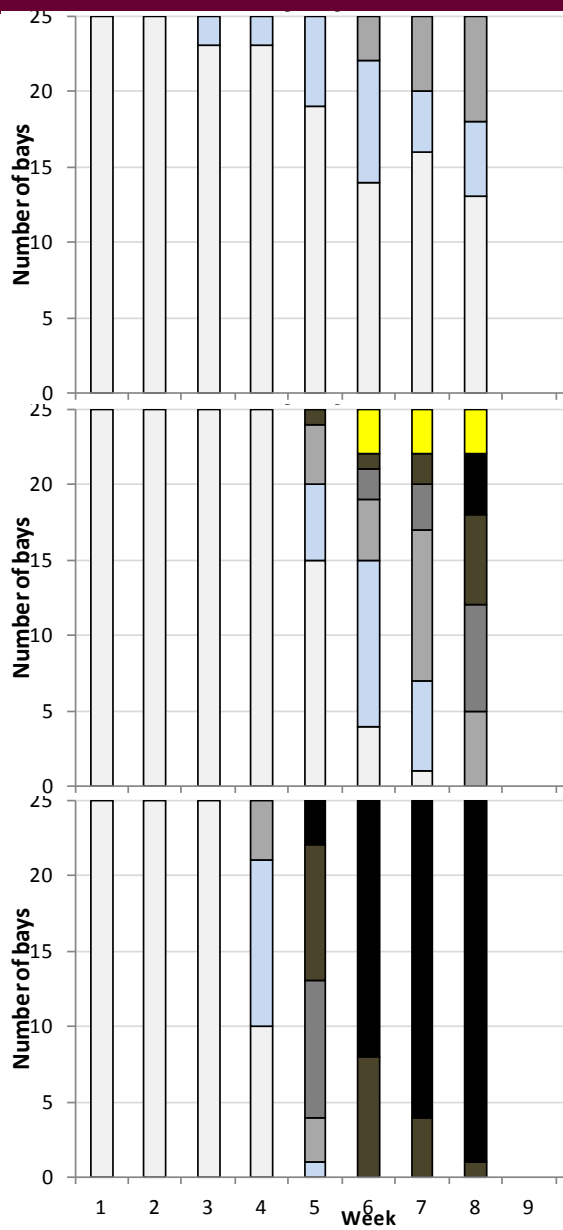
'Hayward'



Rainfall – Te Puke: Sept – Nov 2011



'Hort 16A': orchard differences



Copper use:

Summer'10/11

Winter'11

Spring'11

1

3

5

0

0?

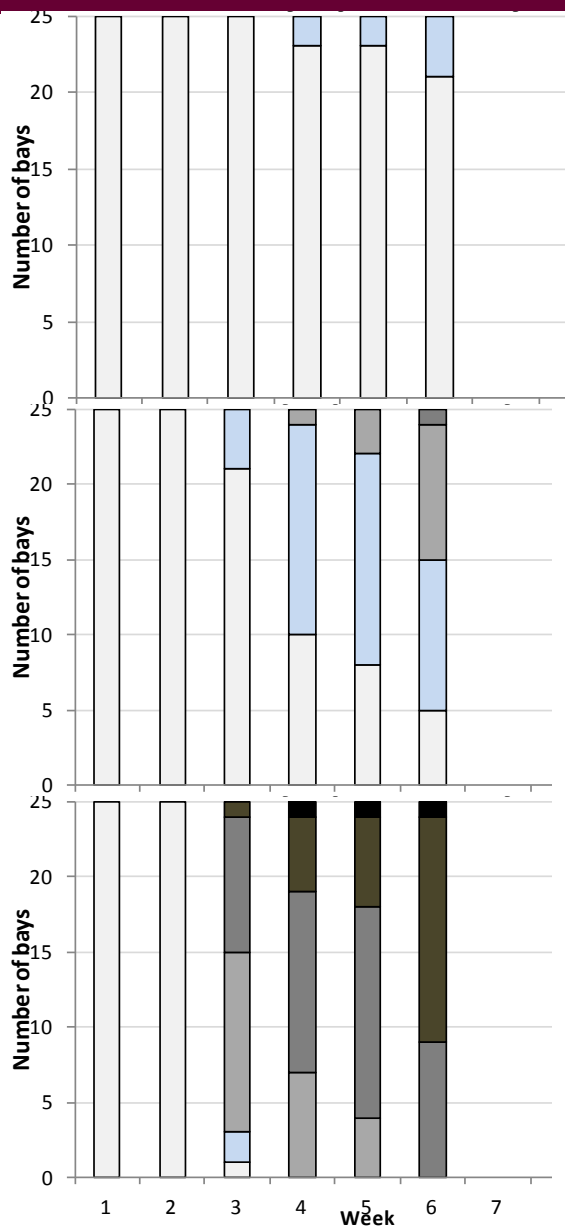
2

0

0?

0?

'Hayward': orchard differences



Copper use:

Summer'10/11

Winter'11

Spring'11

8

3

4

6

2

6

1

2?

3?

Progression within shoots

Shoot 1

		L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11					
13-Oct		0	0	0	0	0	0	0	0								

Shoot 2

		L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14	L15	
13-Oct		0	0	0	0	0	0	0	0	0							

Shoot 3

		L1	L2	L3	L4	L5	L6	L7	L8								
13-Oct		0	0	0	0	0											

Progression within shoots

Shoot 1

		L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11				
13-Oct		0	0	0	0	0	0	0	0							
20-Oct		0	0	0	1	0	1	0	0	0	0					

Shoot 2

		L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14	L15
13-Oct		0	0	0	0	0	0	0	0	0						
20-Oct		0	0	1	1	1	0	0	0	0	0	0				

Shoot 3

		L1	L2	L3	L4	L5	L6	L7	L8							
13-Oct		0	0	0	0	0										
20-Oct		1	1	1	1	1	0									

Progression within shoots

Shoot 1

	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11				
13-Oct	0	0	0	0	0	0	0	0							
20-Oct	0	0	0	1	0	1	0	0	0	0					
27-Oct	0	0	1	1	1	1	1	1	0	0	0				

Shoot 2

	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14	L15
13-Oct	0	0	0	0	0	0	0	0	0						
20-Oct	0	0	1	1	1	0	0	0	0	0	0				
27-Oct	0	0	1	1	1	1	0	0	0	0	0				

Shoot 3

	L1	L2	L3	L4	L5	L6	L7	L8							
13-Oct	0	0	0	0	0										
20-Oct	1	1	1	1	1	0									
27-Oct	1	1	1	1	1	0									

Progression within shoots

Shoot 1

		L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11				
13-Oct	0	0	0	0	0	0	0	0	0							
20-Oct	0	0	0	1	0	1	0	0	0	0	0					
27-Oct	0	0	1	1	1	1	1	1	1	0	0	0				
4-Nov		0	1	1	1	1	1	1	1	0	0	0				

Shoot 2

	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14	L15
13-Oct	0	0	0	0	0	0	0	0	0						
20-Oct	0	0	1	1	1	0	0	0	0	0	0				
27-Oct	0	0	1	1	1	1	0	0	0	0	0				
4-Nov	0	0	1	1	1	1	1	1	0	0	0	0			

Shoot 3

	L1	L2	L3	L4	L5	L6	L7	L8							
13-Oct	0	0	0	0	0										
20-Oct	1	1	1	1	1	0									
27-Oct	1	1	1	1	1	0									
4-Nov	1	1	1	1	1	1	0								

Progression within shoots

Shoot 1

	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11
13-Oct	0	0	0	0	0	0	0	0			
20-Oct	0	0	0	1	0	1	0	0	0	0	
27-Oct	0	0	1	1	1	1	1	1	0	0	0
4-Nov		0	1	1	1	1	1	1	0	0	0
11-Nov		0	1	1	1	1	1	1	1	1	1

Shoot 2

	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14	L15
13-Oct	0	0	0	0	0	0	0	0	0						
20-Oct	0	0	1	1	1	0	0	0	0	0	0				
27-Oct	0	0	1	1	1	1	0	0	0	0	0				
4-Nov	0	0	1	1	1	1	1	1	0	0	0	0			
11-Nov	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0

Shoot 3

	L1	L2	L3	L4	L5	L6	L7	L8
13-Oct	0	0	0	0	0			
20-Oct	1	1	1	1	1	0		
27-Oct	1	1	1	1	1	0		
4-Nov	1	1	1	1	1	1	0	
11-Nov		1		1	1		1	0

Odd observation category



Half bay healthy
(RHS)

Half bay severe
leaf spot
(LHS)

Odd observation category



Half bay healthy
(RHS)

Half bay severe
leaf spot
(LHS)



Summary – the season so far

- » Leaf spot symptoms first appeared in mid-October
- » Wide variation in rate of disease development in different orchards
- » Possible correlation with copper use, but other factors also
- » Infections spreading as shoots grow

Acknowledgments

- » Funded by ZESPRI/KVH
- » Thanks to growers who allowed research on their properties

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www.plantandfood.co.nz/letsbeatpsa



ian.horner@plantandfood.co.nz

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