

Spore release patterns in changing farming systems

McCredden J¹, Cowley RB¹, Marcroft SJ², Van de Wouw AP³

¹ DuPont Pioneer Australia, 13 Lawson Street Wagga Wagga, NSW 2650
² Marcroft Grains Pathology, Grains Innovation Park, 110 Nottmilk Road, Harsham, VIC 3400
³ School of BioSciences, the University of Melbourne, Parkville, Victoria 3050



Background

- ~ Production systems have evolved in the past 20 years
 - ~ Reduced tillage/stubble retention
 - ~ Auto guidance systems
 - ~ Wide row spacing
 - ~ Inter-row sowing
- ~ Plants are emerging into different micro-environment
- ~ Is this changing pest and disease behaviour? And what are the implications for blackleg management?



Previous stubble management strategies



Stubble total spore release per hectare per rainfall event

- 1 year old - 69 450 000
- 2 year old - 1 931 998
- 3 year old - 363 285
- 4 year old - 84 750

Majority of spores released by one-year old stubble

Marcroft et al (2003) Aust. J Exp Agric 43, 1231-1236.



Current stubble conservation strategies (controlled traffic)





Vertical and horizontal stubble collected from farms using inter-row sowing

- ~ Vertical and horizontal stubble collected from two different fields every two weeks between May and August
- ~ Stubble cut into segments
 - ~ 0-5 cm (should stay wetter than the 15-20 cm segment)
 - ~ 15-20 cm
- ~ Stubble allowed to dry and stored until end of season
- ~ Spores liberated using the spore liberator and quantities determined

What is a spore liberator?



- ~ Aka Wind tunnel
- ~ Built by Burkard in 1960s
- ~ Designed for apple scab work
 - ~ Hirst and Stedman (1962) The epidemiology of apple scab (*Venturia inaequalis*). *Ann. appl. Biol.* 50, 515-550.
- ~ Liberation of ascospores

How does the spore liberator work?

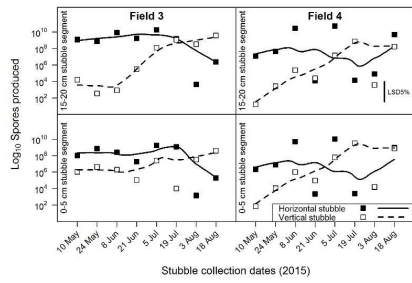
How does the spore liberator work?



Horizontal and vertical stubble produces significantly different quantities of spores

Stubble type	Segment	Average spore release for season	Percentage of total spore release	Average weight of stubble (g)
Horizontal	0-5 cm	158,105	30.5	14.95c
	15-20 cm	229,765	44.3	9.77e
	Total	387,870	74.7	24.72a
Vertical	0-5 cm	47,554	9.2	12.56d
	15-20 cm	83,492	16.1	8.14f
	Total	131,045	25.3	20.70b
Total		518,915		

Spore release patterns changed under new conservation practices



John McCredden - Pioneer

What impact do these changes have on management decisions and disease epidemiology?

- ~ Canola grown in a 1 in 2 year rotation
 - ~ Are there more spores being released in the second year from vertical stubble?
- ~ Is the delayed spore release impacting on disease symptoms?
 - ~ Upper canopy infection



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