Fungicide control of Apple Scab
2014 field trial

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Summary

Apple scab, caused by the fungal pathogen *Venturia inaequalis*, is a significant fruit and foliar disease worldwide (Jones and Sundin 2006). Apples grown in regions of California characterized by spring precipitation or damp microclimates are subject to infection. Initial pathogen colonization of green tissue occurs when water stimulates ascospore release from pseuodothecia located in overwintering leaf litter, followed by dispersal to leaves, flowers or fruit. Asexually-produced conidia from the primary sites of infection on the host can also colonize new tissue if spores are transported in the air or by water splash (Jones and Sundin 2006). In California, periodic applications of synthetic or organic fungicides from approximately March to June are required to control apple scab; the timing of fungicide applications is dependent on season to season patterns in precipitation (Gubler 2006). Based on research in other apple producing regions, additional control measures such as post-harvest fungicide applications at the time of leaf fall to reduce inoculum for the following growing season (Beresford et al. 2008), leaf litter removal (Gomez et al. 2007) or use of cultivar mixtures in an orchard (Didelot et al. 2007) may effectively reduce disease impacts.

We conducted a field experiment near Placerville, El Dorado County, California to test the effects of registered and experimental fungicides on control of apple scab in mature Golden Delicious Trees. Five applications were made from late March (green tip) to late May 2014 (first cover spray after petal fall). We evaluated the trial on June 9, leaves and fruits across all treatments including untreated control exhibit signs of hail damage, with deep depressions on fruit surface and shattered leaves. No scab was observed.

Materials and Methods

A. Trial layout

Experimental unit	1 tree = 1 plot			
Row and tree spacing	16 ft (row) and 10 ft (tree)		Plot unit area	160 ft^2
Area/treatment	640 ft^2 or 0.0147 acre/treatment (4 replicate trees = 1 treatment)			
Fungicide applications	A	green tip	21 March	100 gallons/acre	1.5 gallons/4 replicates
	B	early bloom	9 April	100 gallons/acre	1.5 gallons/4 replicates
	C	full bloom	18 April	100 gallons/acre	1.5 gallons/4 replicates
	D	petal fall	2 May	100 gallons/acre	1.5 gallons/4 replicates
	E	cover spray	23 May	125 gallons/acre	1.8 gallons/4 replicates

B. Trial Map

KD	OD	RKS	W
RS	YD	RS	KC
BD	KC	GKS	BD
GKS	RKS	OD	YD
OD	GKS	KD	RKS
KC	RS	BD	YD
RKS	YD	W	GKS
W	KD	RS	OD
KD	W	KC	BD

N -->

Row	4	3	2	1

Apple Scab – 2014 Experimental treatments

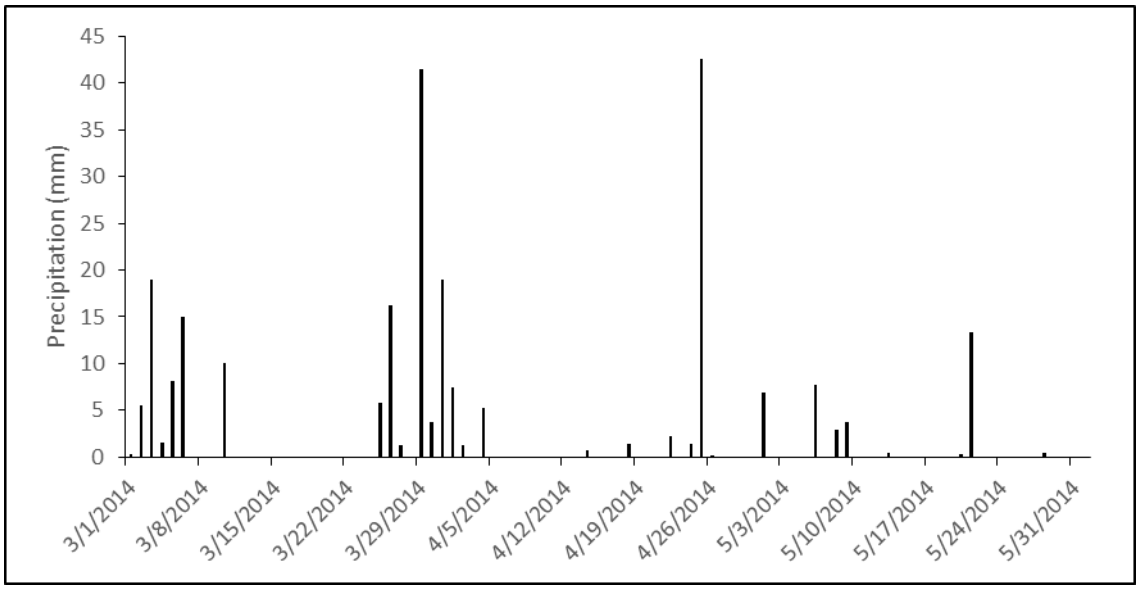
No.	Flag	Product(s)	FP/Acre	FP/Treatment
1	W	Unsprayed control	none	none
2	YD	Sovran + Pristine	4 oz + 16.5 oz	1.7 g + 6.9 g
3	RKS	ISOFETAMID (4x) then Omega	12.5 fl oz (4x) then 10 fl oz	5.4 ml (4x) then 4.3 ml
4	KC	ISOFETAMID + IB18111 (4x) then Omega	6.85 fl oz + 5.57 fl oz (4x) then 10 fl oz	2.97 ml + 2.4 (4x) then 4.3 ml
5	OD	ISOFETAMID + IB18111 (4x) then Omega	6.85 fl oz + 2.97 fl oz (4x) then 10 fl oz	2.97 ml +1.3 ml (4x) then 4.3 ml
6	GKS	ISOFETAMID + IB18111 (4x) then Omega	3.43 fl oz + 5.57 fl oz (4x) then 10 fl oz	1.5 ml + 2.4 ml (4x) then 4.3 ml
7	BD	Vangard 75WG then Manzate Pro-stick then A15457 then Inspire super 2.82EW then A15457	5 oz then 96 oz then 6.84 fl oz then 12 fl oz then 6.84 fl oz	2.1 g then 40.0 g then 3.0 ml then 5.2 ml then 3.0 ml
8	RS	Vangard 75WG then Manzate Pro-stick then A15457 then Inspire Super 2.82EW then A15457 (2 weeks interval after green tip: 3/21, 4/4, 4/18, 5/2)	5 oz then 96 oz then 6.84 fl oz then 12 fl oz then 6.84 fl oz	2.1 g then 40.0 g then 3.0 ml then 5.2 ml then 3.0 ml
9	KD	Vangard 75WG then Manzate Pro-stick then A19334 then Inspire Super 2.82EW then A19334	5 oz then 96 oz then 7.04 fl oz then 12 fl oz then 7.04 fl oz	2.1 g then 40.0 g then 3.1 ml then 5.2 ml then 3.1 ml

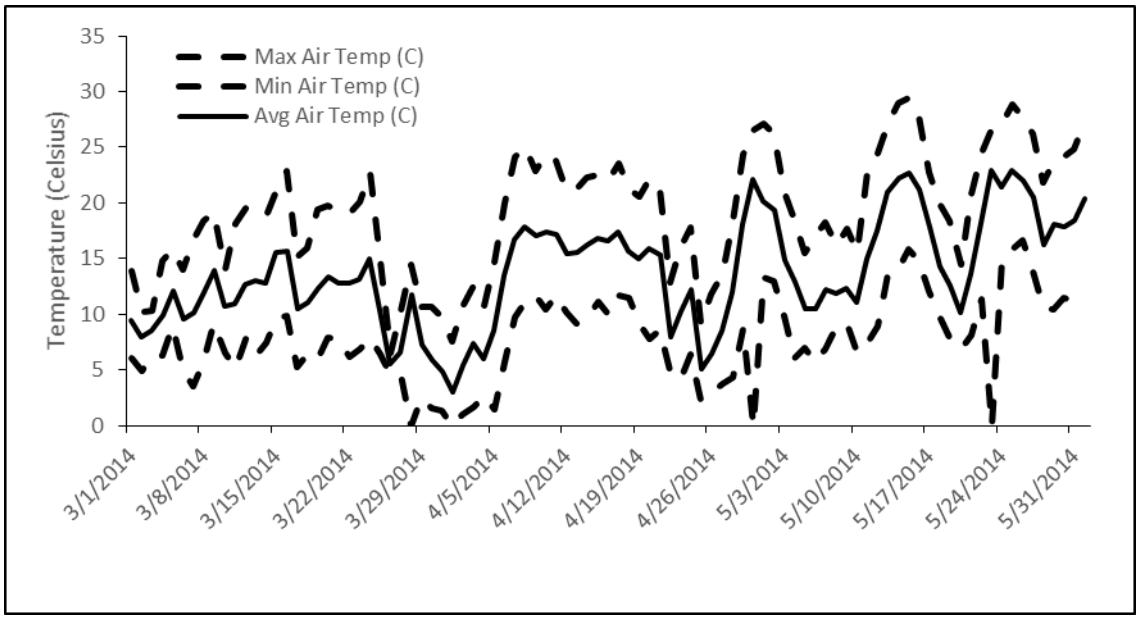
C. Disease and statistical analysis

Disease was assessed on June 9 2014 when fruits were large enough to observe diseases. No disease was present.

D. Weather and Disease

Weather from CIMIS weather station in Camino, California. The area had a prolonged chilling period at the beginning of the season followed by some hail events in April and May. Precipitation data from Mar 1 to June 1 ranged from 1 to 43 mm.





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Appendix: Products tested

Product	Active ingredient(s) and concentration	Class	Manufacturer
A15457	Proprietary	N/A	Proprietary
A19334	Proprietary	N/A	Proprietary
IB18111	Proprietary	N/A	Proprietary
Inspire Super 2.82EW	difenoconazole/ cyprodinil	DMI-triazole (3)/ AP (9)	Syngenta
Isofetamid	Proprietary	N/A	Proprietary
Manzate Pro-Stick	mancozeb (75%)	carbamate	United Phosphorus, Inc.
Omega 500f	Fluazinam (40.0%)	Pyridinamine	Syngenta
Pristine	pyraclostrobin (12.8%) boscalid (25.2%)	QoI + carboxamide	BASF
Sovran	kresoxim-methyl (50%)	QoI	Cheminova
Vangard 75WG	Cyprodinil	AP[7] (9)	Syngenta

Appendix references: (1) Adaskaveg, et al. 2012. Efficacy and timing of fungicides, bactericides and biologicals for deciduous tree fruit, nut, strawberry, and vine crops 2012, available at http://www.ipm.ucdavis.edu/PDF/PMG/fungicideefficacytiming.pdf.
(2) Gubler Lab fungicide efficacy field trials, available at http://plantpathology.ucdavis.edu/Cooperative_Extension/.
(3) Various sources including product labels and/or MSDS, product websites, and personal communications.