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# Fungicide control of Pear Scab: 2015 field trial

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## A. Materials and Methods

**Table 1. Experimental design and application timing.**

Experimental design	Complete randomized design with 4 replicates				
Experimental unit	1 tree = 1 plot				
Row and tree spacing	20 ft (row) and 10 ft (tree)	Plot unit area	200 ft <sup>2</sup>		
Area/treatment	800 ft <sup>2</sup> or 0.0184 acre/treatment (4 replicate trees = 1 treatment)				
Fungicide applications	A	green tip	4 Mar	100 gallons/acre	1.8 gallons/4 replicates
	B	early bloom	10 Mar	100 gallons/acre	1.8 gallons/4 replicates
	C	full bloom	16 Mar	100 gallons/acre	1.8 gallons/4 replicates
	D	petal fall	20 Mar	100 gallons/acre	1.8 gallons/4 replicates
	E	1st cover spray	3 Apr	125 gallons/acre	2.3 gallons/4 replicates
	F	2nd cover spray	2 Apr	125 gallons/acre	2.3 gallons/4 replicates
	G	3rd cover spray	19 May	125 gallons/acre	2.3 gallons/4 replicates
Equipment	Stihl SR 420 Backpack Sprayers				

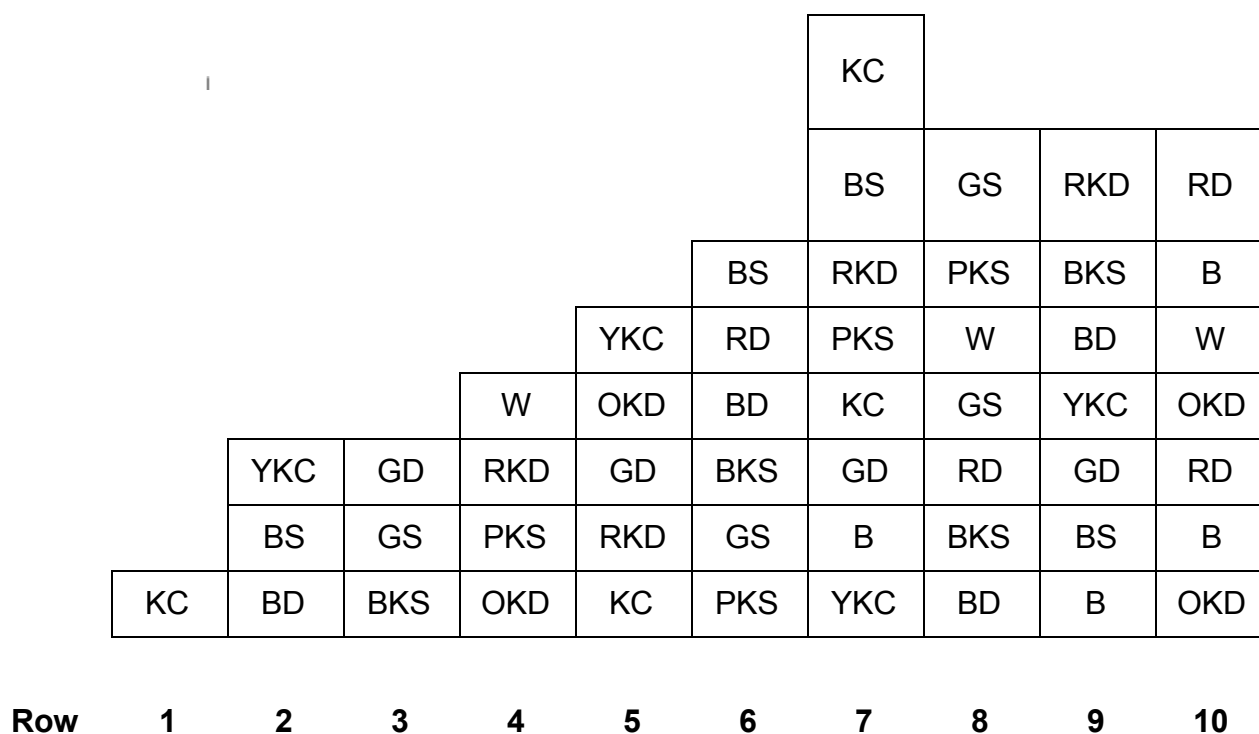
**Table 2. Treatment programs. "FP" = formulated product.**

No.	Flag	Product(s)	FP/Acre	FP/Treatment
1	W	Unsprayed control	none	none
2	RKD	Sovran	4 oz	2.1 g
3	PKS	Syllit (3x) then Manzate Pro-stick	3 pt (3x) then 3 lb	26.1 ml (3x) then 25.0 g
4	RD	Syllit (36 hrs eradicant after rain event)	3 pt	26.1 ml
5	BKS	Tebuconazole	2 oz/100 gal	1.0 g
6	GS	Manzate Pro-stick	3 lb	25.0 g
7	GD	Ziram (4x) then Manzate Pro-stick	6 lb then 3 lb	50.0 g then 25.0 g
8	YKC	Microthiol Disperss (sulfur)	30 lb	250.0 g
9	BS	Merivon (4x) then Manzate Pro-stick	5 fl oz (4x) then 3 lb	2.7 ml (4x) then 25.0 g

10	BD	Topsin-M	16 oz	8.4 g
11	KC	Serenade Optimum	24 oz	12.5 g
12	B	(5 apps from early bloom) Vanguard then Inspire Super then Aprovia (2x) then Inspire Super	5 oz then 12 fl oz then 6.84 fl oz (2x) then 12 fl oz	2.6 g then 6.5 ml then 3.7 ml (2x) then 6.5 ml
13	OKD	(5 apps from early bloom) Vanguard then Inspire Super then Aprovia + Manzate Pro-Stick (2x) then Inspire Super	5 oz then 12 fl oz then 6.84 fl oz + 3 lb (2x) then 12 fl oz	2.6 g then 6.5 ml then 3.7 ml + 25.0 g (2x) then 6.5 ml

**Note:** The treatments described in this report were conducted for experimental purposes only and crops treated in a similar manner may not be suitable for commercial or other use.

**Figure 1. Trial layout.**



## B. Disease and Statistical Analysis

Disease was assessed on Jun 30 when fruits were large enough to observe scab lesions. Forty leaves and fruits were randomly selected from each tree. The number of lesions were scored for each leaf and fruit; estimated counts were made when the boundaries of individual lesions could be not easily distinguished. Disease incidence per replicate was determined as the proportion of leaves and fruits that were infected by at least one lesion. Disease severity for

each plot was obtained as the mean density of lesions on leaves and fruits. Data was analyzed using ANOVA Fit Model test for data. Comparison of the means was made using Student's t-test with  $\alpha=0.05$ .

### C. Weather and Disease

Daily temperature and precipitation values were obtained from CIMIS weather station 085. Overall temperature were mild (Figure 3) with major precipitation events recorded on Mar 22, Apr 6, Apr 7, Apr 24 and May 14 as 1.0, 1.3, 2.2, 1.3 respectively (Figure 2).

**Figure 2.** Precipitation data for the spray season with five rain events (Mar 1 – Jun 30) of 0.1 – 2.2 mm of rain.

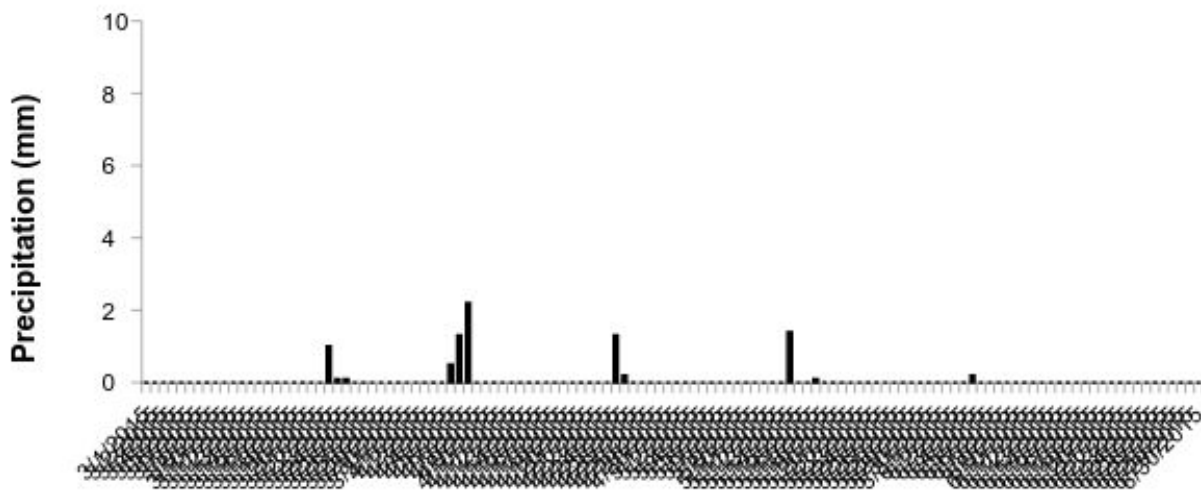
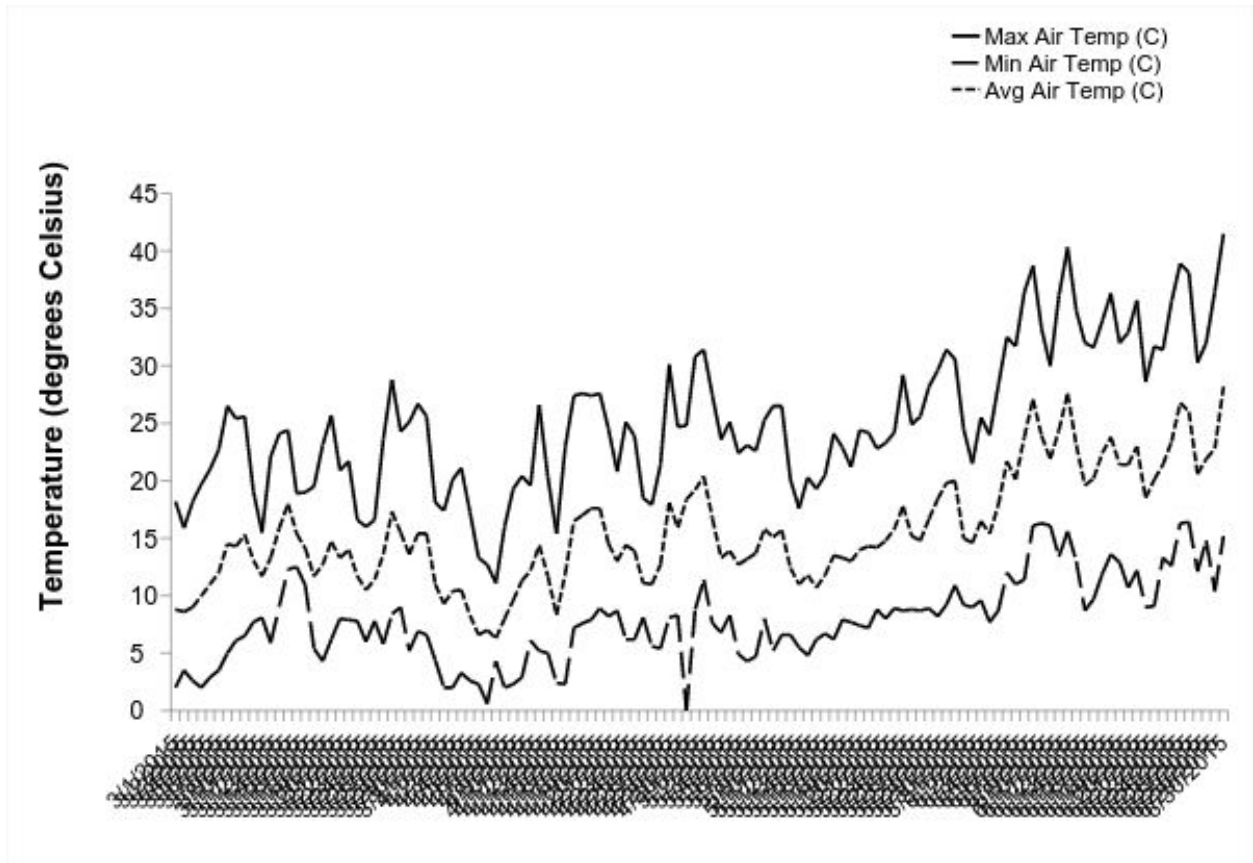


Figure 3. Daily temperature data from Mar 1 to Jun 30 2015.



D.

## Results

**Table 3.** Pear scab fruit incidence (means). Product names are followed by rate (per acre). Treatment means followed by the same letter are not significantly different according to Student's t-test at  $\alpha=0.05$ .

Treatment	Fruit Disease Incidence (%)	Fruit Disease Severity (%)
(5 apps from early bloom) Vanguard, 5 oz then Inspire Super, 12 fl oz then Aprovia, 6.84 fl oz (2x) then Inspire Super, 12 fl oz	1.88 c	0.03 b
(5 apps from early bloom) Vanguard, 5 oz then Inspire Super, 12 fl oz then Aprovia, 6.84 fl oz + Manzate Pro-Stick, 3 lbs (2x) then Inspire Super, 12 fl oz	3.13 bc	0.03 b
Sovran, 4 oz	6.88 abc	0.08 b
Mazate Pro-Stick, 3 lbs	7.50 abc	0.10 ab
Syllit, 3 pts (36 hrs as eradicant after rain event)	10.63 abc	0.16 ab
Tebuconazole, 2 oz/100 gal	13.75 abc	0.44 ab
Microthiol Disperss (sulfur), 30 lbs	15.63 abc	0.55 a
Serenade Optimum, 24 oz	16.67 abc	0.30 ab
Ziram, 6 lbs ( 4 apps) then Manzate Pro-stick, 3 lbs (3 apps)	17.50 abc	0.23 ab
Syllit, 3 pts (3 apps) then Manzate Pro-stick, 3 lbs (4 apps)	18.78 abc	0.41 ab
Topsin-M, 16 oz	19.49 ab	0.28 ab
Merivon, 5 fl oz (4 apps) then Manzate Pro-stick, 3 lbs (3 apps)	20.87 a	0.37 ab
Unsprayed Control	21.25 a	0.28 ab

**Table 4.** Pear scab leaf incidence (means). Product names are followed by rate (per acre). Treatment means followed by the same letter are not significantly different according to Student's t-test at  $\alpha=0.05$ .

Treatment	Leaf Disease Incidence (%)	Leaf Disease Severity (%)
(5 apps from early bloom) Vanguard, 5 oz then Inspire Super, 12 fl oz then Aprovia, 6.84 fl oz (2x) then Inspire Super, 12 fl oz	1.88 b	0.11 a
Sovran, 4 oz	5.63 ab	0.09 a
Tebuconazole, 2 oz/100 gal	6.88 ab	0.13 a
Syllit, 3 pts (36 hrs as eradicant after rain event)	9.38 ab	0.31 a
(5 apps from early bloom) Vanguard, 5 oz then Inspire Super, 12 fl oz then Aprovia, 6.84 fl oz + Manzate Pro-Stick, 3 lbs (2x) then Inspire Super, 12 fl oz	9.38 ab	0.19 a
Syllit, 3 pts (3 apps) then Manzate Pro-stick, 3 lbs (4 apps)	10.00 ab	0.16 a
Serenade Optimum, 24 oz	10.63 ab	0.28 a
Merivon, 5 fl oz (4 apps) then Manzate Pro-stick, 3 lbs (3 apps)	12.50 ab	0.29 a
Topsin-M, 16 oz	14.38 ab	0.41 a
Mazate Pro-Stick, 3 lbs	15.00 ab	0.23 a
Ziram, 6 lbs ( 4 apps) then Manzate Pro-stick, 3 lbs (3 apps)	15.00 ab	0.52 a
Microthiol Disperss (sulfur), 30 lbs	20.00 ab	0.49 a
Unsprayed Control	23.13 a	0.41 a

## E. Acknowledgements

We thank Tim Norgard of Norgard Farms for use of his orchard.

## F. References

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## G. Appendix: Products tested

Product	Active ingredient(s) and concentration	Class	Manufacturer
Aprovia	Proprietary	N/A	Proprietary
Inspire Super 2.82EW	Cyprodinil (24.1%), Difenoconazole (8.4%)	DMI-triazole (3)/ AP (9)	Syngenta
Isofetamid	Proprietary	N/A	Proprietary
Manzate Pro-stick	Mancozeb (75%)	Carbamate	United Phosphorous
Merivon	Fluxopyroxad (21%), Pyraclostrobin (21%)	SDHI (7)/QoI (11)	BASF
Microthiol Disperss	Sulfur (80%)	Inorganic (M2)	United Phosphorous
Serenade Optimum	QST 713 strain of <i>Bacillus subtilis</i> (26%)	Microbial	Bayer
Sovran	Kresoxim-methyl (50%)	QoI (11)	Cheminova



Syllit	Dodine (40%)	Guanidine (M7)	Agriphar
Tebuzol 45 DF (Elite)	Tebuconazole (45%)	DMI-triazole (3)	United Phosphorous
Topsin-M	Thiophanate-methyl (70%)	MBC (1)	UPI
Vangard 75WG	Cyprodinil (75%)	AP7 (9)	Syngenta
Ziram 76DF	Ziram (76%), Zinc (16.25%)	Carbamate (DMDC)3 (M3)	UPI

*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/](http://plantpathology.ucdavis.edu/Cooperative_Extension/).

(3) Various sources including product labels and/or MSDS, product websites, and personal communications.