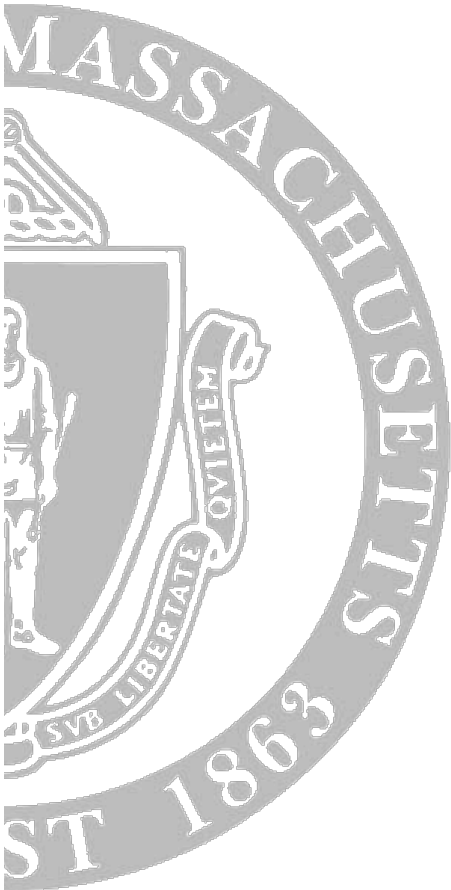
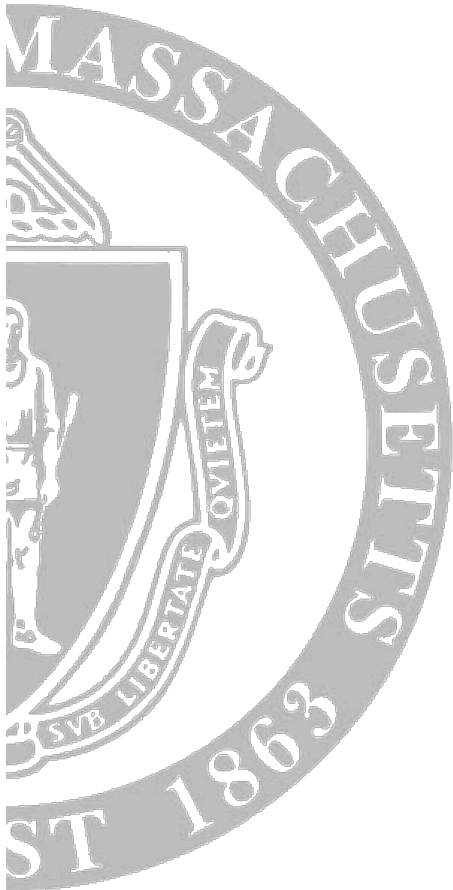


# Changes in fungicide use by five New England apple growers over 9 years



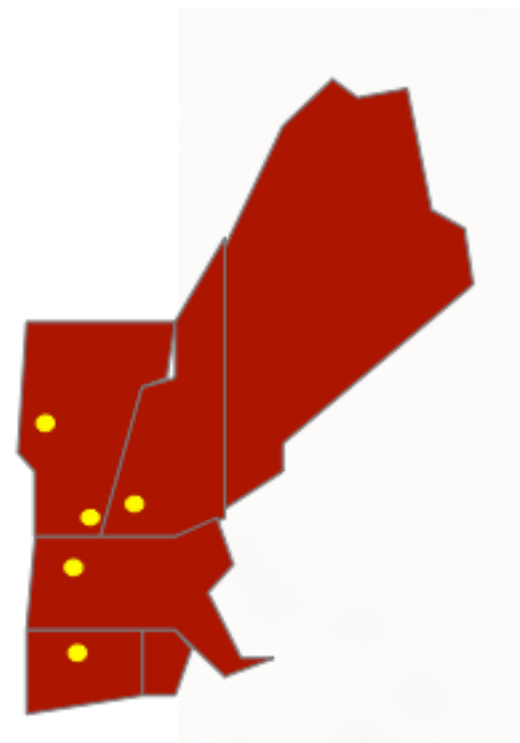


How to get guaranteed  
results

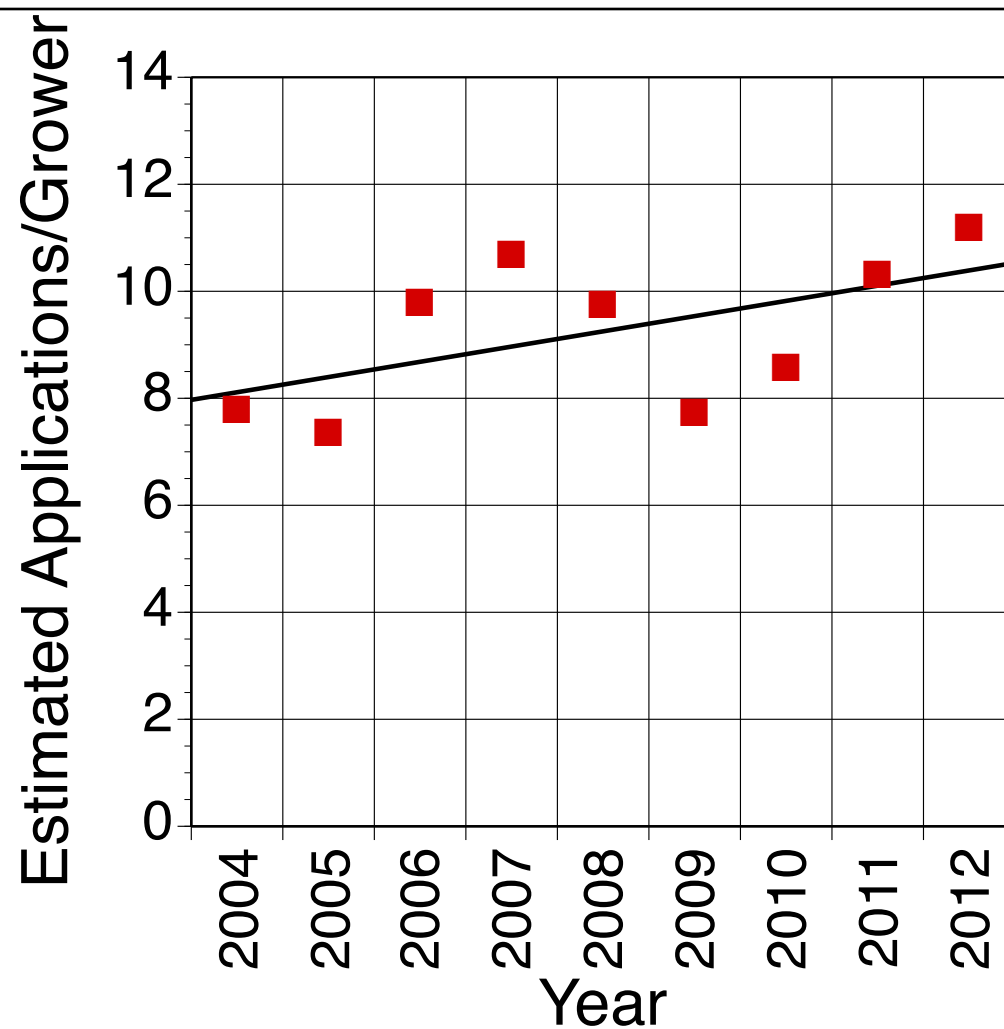
## Why bother delaying sprays?

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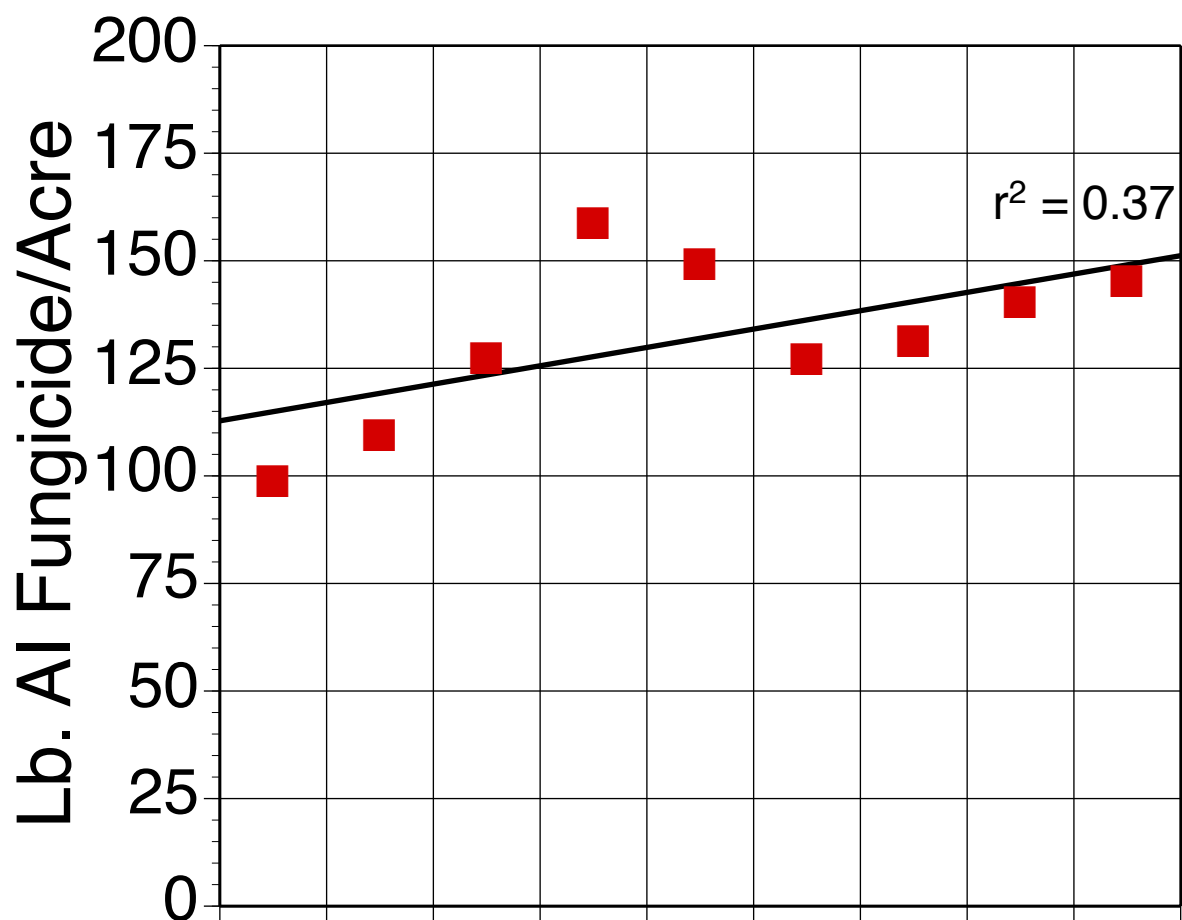
Five growers in four New England states kept detailed pesticide use records from 2004 through 2012. Orchard size varied from 35 to 193 acres, with a mean total average of 430 acres over 8 years.



## Number of fungicide applications up



## Amount of fungicide used is up



## Changes in different fungicide classes

Fungicide	Total lb. AI per acre change	Number of applications change
Captan	65%	38%
EBDCs	47%	38%
DMIs, Qols, APs	84%	22%
Thiophanate methyl	25%	30%
Dodine	-42%	-120%
Copper, sulfur	-40%	33%

## Typical fungicide program 2004-05

Early Fungicide Program, EIQ					
Fungicide	EIQ	AI	Lb/A	Uses	Total
Kocide	33.3	0.45	7	1	21
Captan 80WDG	15.8	0.8	2	4	101
Captan 80WDG	15.8	0.8	2.5	1	32
Captan 80WDG	15.8	0.8	1	2	25
Penncozeb 80DF	14.6	0.8	3	2	70
Polyram 80DF	40	0.8	3	1	96
Syllit 65WG	22	0.65	1	1	14
Rally 40WSP	33	0.4	0.25	1	3
Flint	30.9	0.5	0.125	1	2
Topsin M 70WDG	22.42	0.7	0.75	3	35
<b>Total</b>				<b>17</b>	<b>400</b>

## Typical fungicide program 2011-12

Recent Fungicide Program, EIQ					
Fungicide	EIQ	AI	Lb/A	Uses	Total
Kocide	33.3	0.45	7	1	105
Captan 80WDG	15.8	0.8	2.5	3	95
Captan 80WDG	15.8	0.8	2	2	51
Captan 80WDG	15.8	0.8	1	3	38
Penncozeb 80DF	14.6	0.8	3	3	105
Polyram 80DF	40.0	0.8	3	1	96
Syllit 65WG	22.0	0.65	1	1	14
Rally 40WSP	33.0	0.4	0.2	1	3
Flint	30.9	0.5	0.125	1	2
Topsin M 70WDG	22.4	0.7	0.75	3	35
Inspire Sup. cyprodinil	21.9	0.24	0.09	1	0
Inspire Sup. difenoconazole	48.7	0.08	0.09	1	0
<b>Total</b>				<b>21</b>	<b>544</b>



# PRiME

## PRiME Cumulative Risk Evaluation of Fungicide Programs

Risk Index	Numerical Risk by Program	
	Early	Recent
Aquatic Algae	0.22	0.24
Aquatic Inv.	0.45	0.58
Avian Acute	0.44	0.49
Avian Reproductive	1	1
Earthworm	1	1
Fish Chronic	0	0
Inhalation	0.92	0.97
Small Mammal Acute	0	1

# Potential Ascospore Dose (PAD) measures inoculum

- MacHardy/Gadoury PAD based on inoculum in orchard
- Measure by scouting in fall



# Inoculum reduction through sanitation

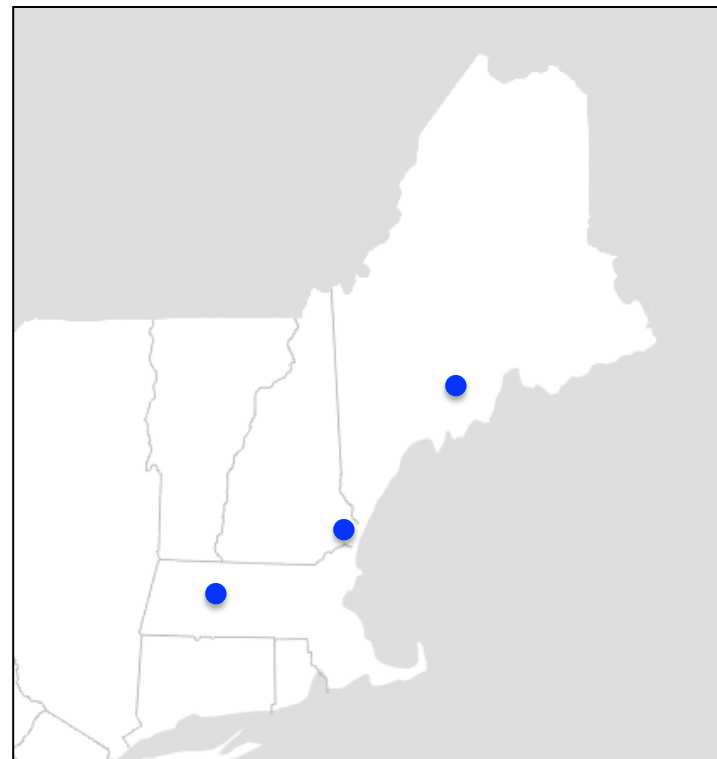
- Flail (preferable) or rotary mow
- Apply urea on tree or to leaves on the ground
- Leaves break down, *Venturia* can't survive



## Nine years of detailed records

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New SARE project between Mass, NH and Maine to further evaluate PAD measurement and inoculum reduction and to educate growers in the methods.



## PAD-based delay results 2008-2011

Year	Delay blocks	Mean delay days (gs)	Mean infection periods	Harvest scab delay	Harvest scab check
2008	7	-	-	0.1%	2.2%
2009	9	9 (TC)	1.7	3.6%	10.3%
2010	5	8 (TC)	1.2	0.8%	0.4%
2011	6	6 (TC)	1.7	0.6%	1.5%

In 27 test blocks, all delay treatments had less fruit scab at harvest than checks.

Saved 1 to 3 fungicide applications (avg. 1.7).

## PAD-based delay results 2012 - 2013

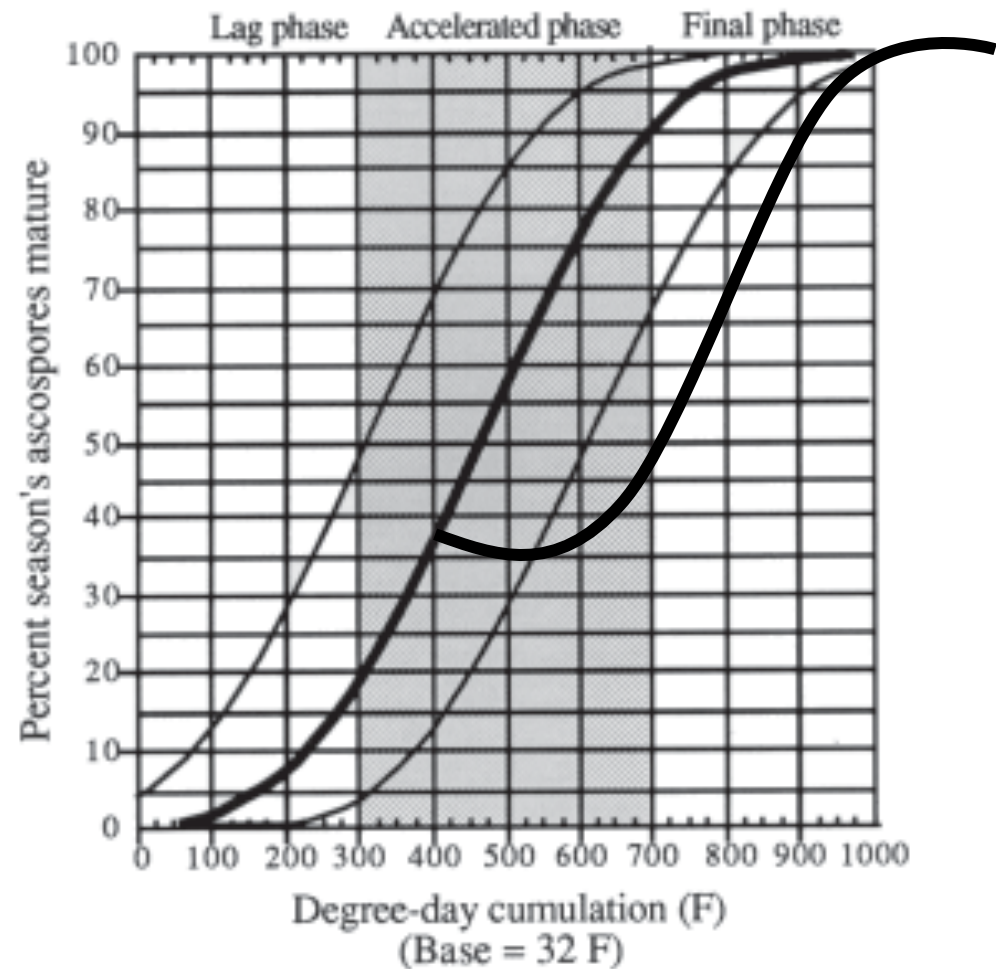
Year	Delay blocks to	Mean delay days (gs)	Mean infection periods	Harvest scab delay	Harvest scab check
2012	pink - 7	14	0.3	0.7%	0.3%
	bloom - 4	29	1	0.2%	-
	petal fall -1	30	3	2.5%	0%
2013	pink – 6	7	0	0.8%	2.2%
	bloom – 4	10	0	0	0

Inoculum maturation an issue.



# Inoculum maturation not following model

- Prolonged dry periods appear to be stopping maturation
- Resumption of wet weather releases large proportion of season's inoculum
- Wet weather has also been prolonged



# Thanks

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This work was made possible by a grant from the Northeast Regional IPM Center, and Northeast SARE

Thanks also to the growers who took on the challenge of trying this approach.

And of course Arthur Tuttle who coordinates the field work.

