

2016

Fruit Rot Management in 2016: A year with Bravo

Erika Saalau Rojas

UMass Amherst, Cranberry Station, esaalau@umass.edu

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The Commonwealth's Flagship Campus

Fruit Rot Management in 2016: A year with Bravo



Erika Saalau Rojas
UMass Cranberry Station-Winter Meeting
January 18, 2017

Topics

- Efficacy field trials
 - ‘New’ and ‘old’ fungicides
- Timing of applications
- Fruit quality- stay tuned
- Summary



Fungicides available

Group	FRAC	Risk Resistance	Spectrum of Activity	Efficacy
DMI	Indar Proline	M	Gaps	HIGH
Qol	Abound	H	Gaps	HIGH
Polyoxins	Oso, Ph-D	M	Unknown	LOW?
chloronitr	Bravo	L	Broad	HIGH
dithiocar	Dithane, Manzate	L	Broad	HIGH

Fungicides available

Group	FRAC	Risk Resistance	Spectrum of Activity	Efficacy
SDHI	7	M to H	?	?
Biofungicides	Var	Unknown	?	?
DMI	3	M	Gaps	HIGH
QoI	11	H	Gaps	HIGH
Polyoxins	19	M	Unknown	LOW
chloronitriles	M5	L	Broad	HIGH
dithiocarbamates	M3	L	Broad	HIGH

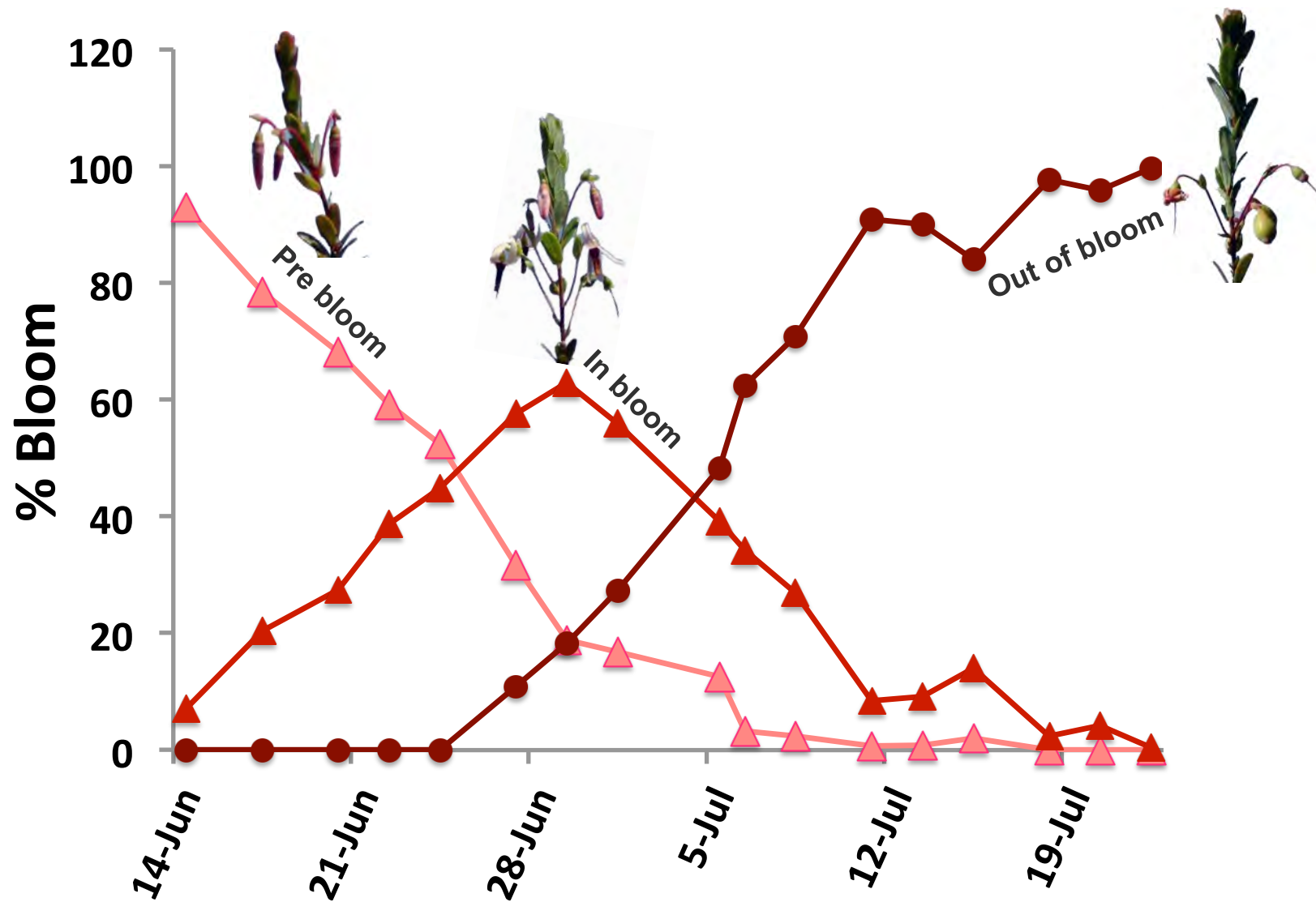
Efficacy trials

- Stevens plots
- Treatments included 3 applications
 - (7-14 days)
- Screening of 'new' products
 - Polyoxin-D (Oso and PhD)
 - SDHI (Kenja, Fluopyram fungicide)
 - Biofungicide (Regalia)

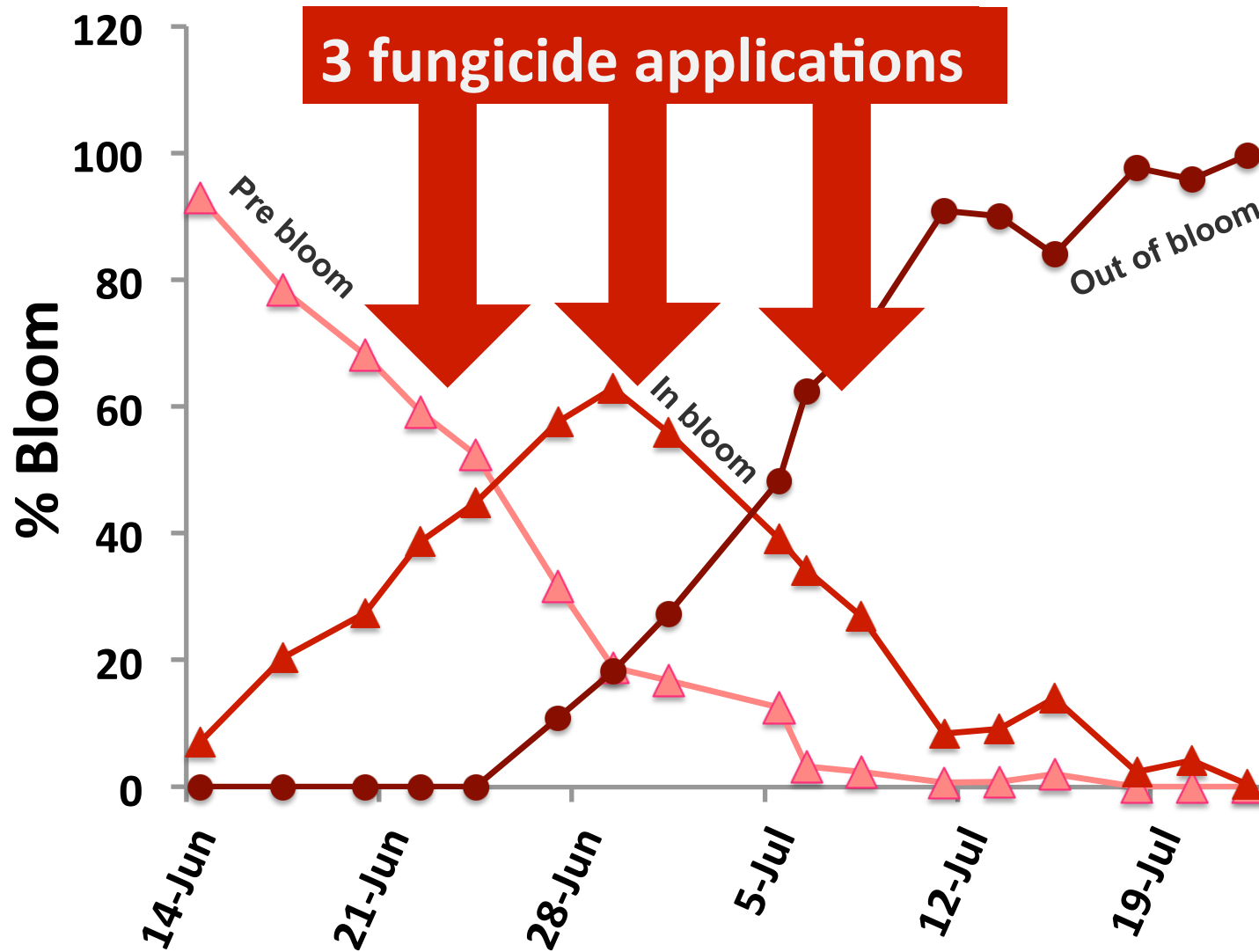


Efficacy trials

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Efficacy trials



GROUP 7 FUNGICIDE

KENJA 400SC

FUNGICIDE

ACTIVE INGREDIENT: Isofetamid* 36.0%
 OTHER INGREDIENTS: 64.0%
 Total 100.0%

*N-[1,1-dimethyl-2-[2-methyl-4-(1-methylethoxy)phenyl]-2-oxoethyl]-3-methyl-2-thiophenecarboxamide

Contains 3.33 pounds Isofetamid Per Gallon (400 grams per liter)

**KEEP OUT OF REACH OF CHILDREN
 CAUTION**

See side panel for additional precautionary statements.
 Read entire label carefully and use only as directed.

Distributed by:

SummitAgro USA
 Summit Agro USA, LLC

Anthracnose (bitter rot pathogen)
Botrytis (miscellaneous rots-storage)

SPECIMEN LABEL



A plant extract to boost the plants' defense mechanisms to protect against certain fungal and bacterial diseases, and to improve plant health.

Active ingredient: Extract of *Reynoutria sachalinensis* 5 %
 Other ingredients: 95 %
 Total: 100 %

EPA Reg. No. 84059-3
 EPA Est. No. 085970-FL-001
 EPA Est. No. 84059-MI-001

GROUP P5 FUNGICIDE

Efficacy Stevens 1

TRT	1 st Application	2 nd Application	3 rd Application
1	Kenja (full rate)	Kenja (full rate)	Kenja (full rate)
2	Kenja+ Regalia	Kenja+ Regalia	Kenja+ Regalia
3	SDHI (full rate)	SDHI (full rate)	SDHI (full rate)
4	Oso (full rate)	Oso (full rate)	Oso (full rate)
5	Ph-D (full rate)	Ph-D (full rate)	Ph-D (full rate)
6	Regalia (full rate)	Regalia (full rate)	Regalia (full rate)
7	Bravo	Bravo	Bravo

Efficacy Stevens 1

TRT	1 st Application	2 nd Application	3 rd Application
1	Kenja (full rate)	Kenja (full rate)	Kenja (full rate)
2	Kenja+ Regalia	Kenja+ Regalia	Kenja+ Regalia
3	SDHI (full rate)	SDHI (full rate)	SDHI (full rate)
4	Oso (full rate)	Oso (full rate)	Oso (full rate)
5	Ph-D (full rate)	Ph-D (full rate)	Ph-D (full rate)
6	Regalia (full rate)	Regalia (full rate)	Regalia (full rate)
7	Bravo	Bravo	Bravo

Results Stevens 1

TRT	3 Applications	% Field Rot
1	Kenja (full rate)	30.8% a
2	Kenja+ Regalia	39.0% a
3	SDHI (full rate)	18.8% ab
4	Oso (full rate)	26.0% ab
5	Ph-D (full rate)	24.7% ab
6	Regalia (full rate)	37.6% a
7	Bravo	6.8% b

Results Stevens 1

TRT	3 Applications	% Field Rot
1	Kenja (full rate)	30.8% a
2	Kenja+ Regalia	39.0% a
3	SDHI (full rate)	18.8% ab
4	Oso (full rate)	26.0% ab
5	Ph-D (full rate)	24.7% ab
6	Regalia (full rate)	37.6% a
7	Bravo	6.8% b

Efficacy Stevens 2

TRT	1 st App.	2 nd App.	3 rd App.
1	Kenja (full rate)	Kenja (full rate)	Bravo
2	Oso (full rate)	Oso (full rate)	Bravo
3	Oso+Regalia (full rate)	Oso+Regalia (full rate)	Bravo
4	Oso (half rate)	Oso (half rate)	Bravo
5	Ph-D (full rate)	Ph-D (full rate)	Bravo
6	Proline	Proline	Bravo
7	Proline	Proline	Manzate



Last application: Broad spectrum, high efficacy

Efficacy Stevens 2

TRT	2 Applications	% Field Rot
1	2XKenja (full rate)+1XBravo	18.1% a
2	2XOso (full rate)+1XBravo	22.2% a
3	2XOso+Regalia (full rate)+1XBravo	14.1% a
4	2XOso (half rate)+1XBravo	15.9% a
5	2XPh-D (full rate)+1XBravo	16.1% a
6	2XProline+1XBravo	17.0% a
7	2XProline+1XManzate	11.1% a



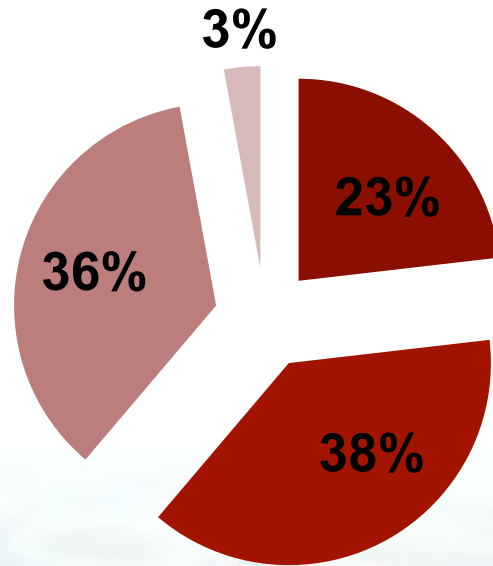
No statistical differences

Should you try them next year?

- Not exclusively, use caution
- Need at least another growing season
- Site conditions?
 - Fruit rot history
 - Cultural practices



Field Rot Fungi in 2016

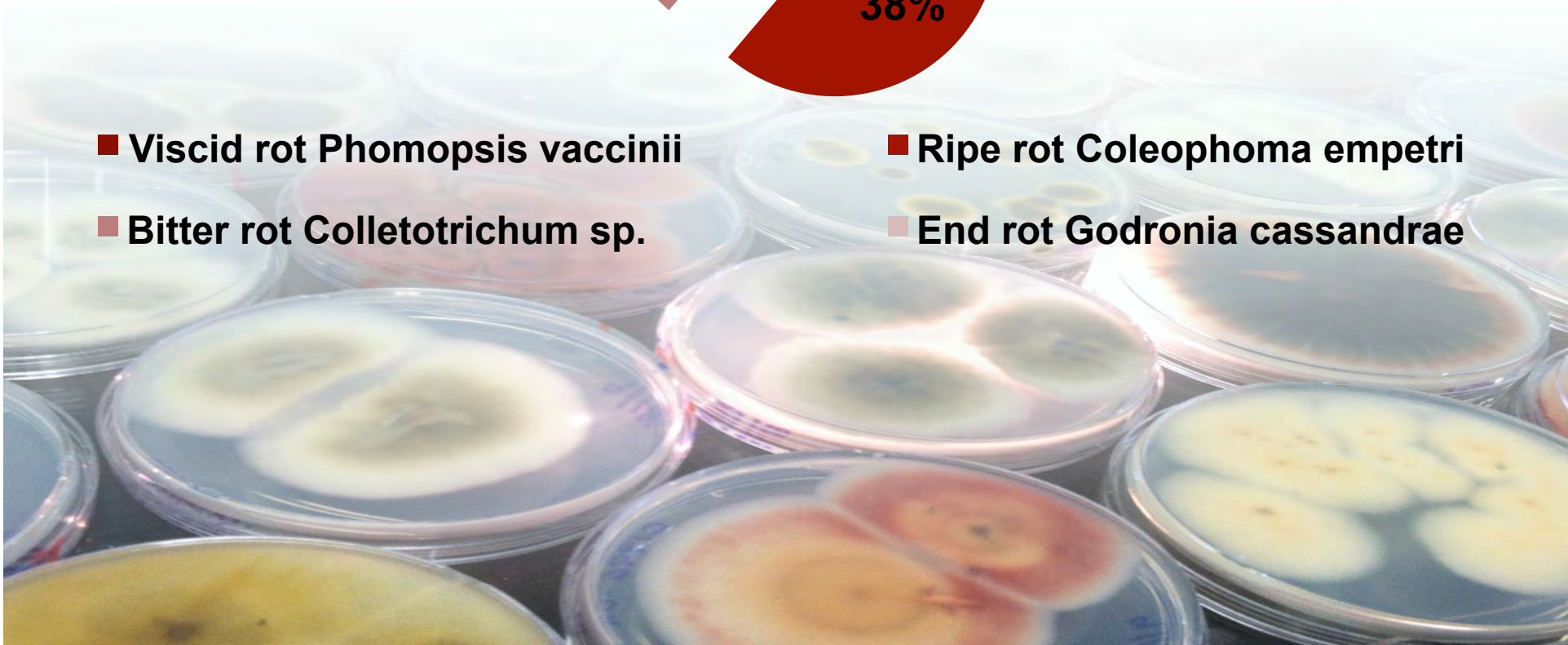


■ Viscid rot *Phomopsis vaccinii*

■ Bitter rot *Colletotrichum* sp.

■ Ripe rot *Coleophoma empetri*

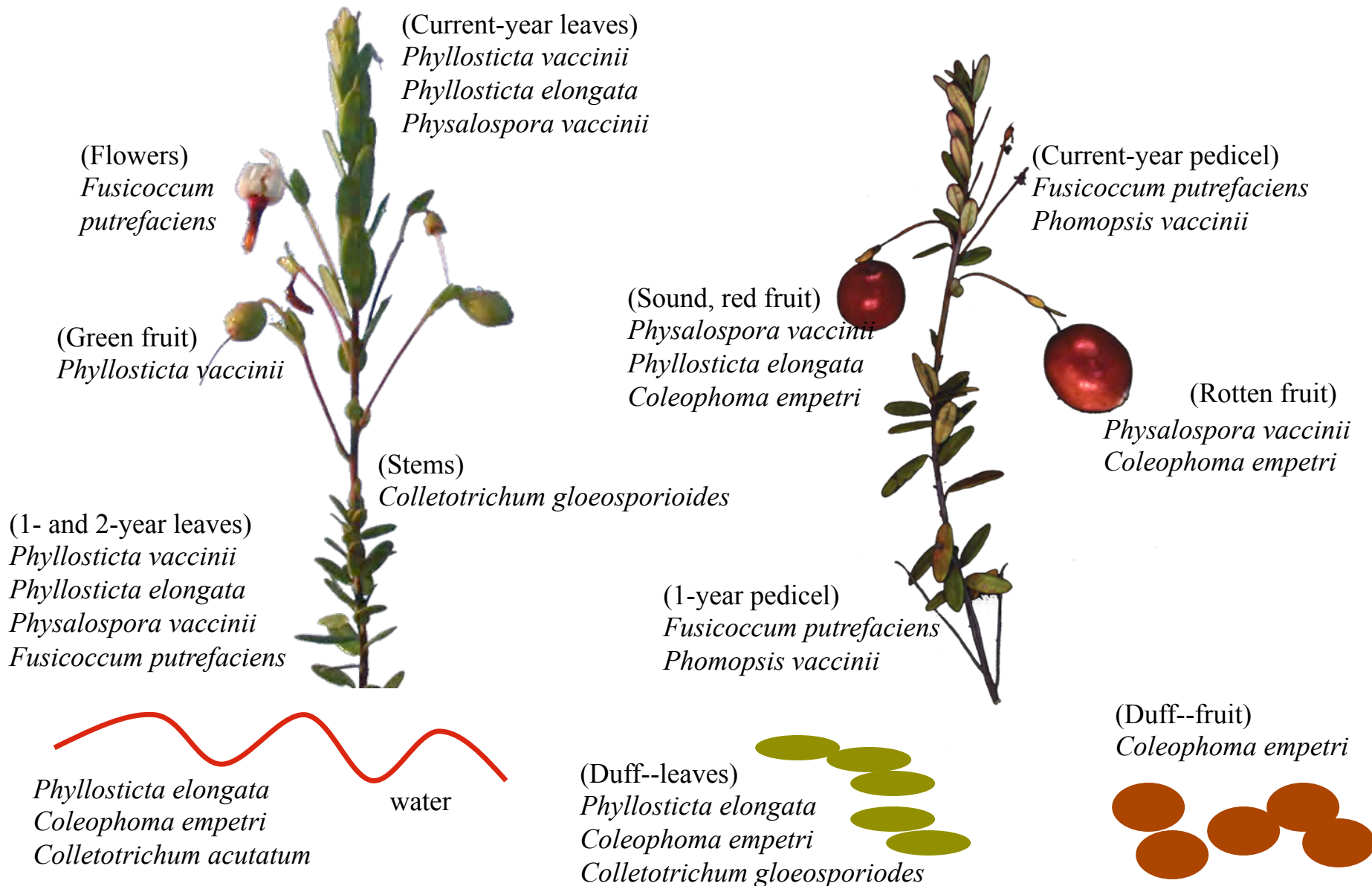
■ End rot *Godronia cassandrae*



Where are the pathogens hiding?

Caruso, McManus, Oudemans
2003

wind → *Phyllosticta elongata*
→ *Colletotrichum acutatum*



Where are the pathogens hiding?

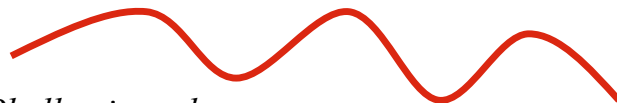
Caruso, McManus, Oudemans
2003



(Stems)
Colletotrichum gloeosporioides



(Rotten fruit)
Physalospora vaccinii
Coleophoma empetri

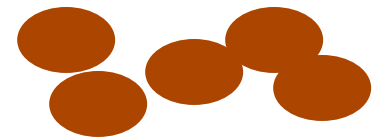


Phyllosticta elongata
Coleophoma empetri
Colletotrichum acutatum

(Duff--leaves)
Phyllosticta elongata
Coleophoma empetri
Colletotrichum gloeosporioides



(Duff--fruit)
Coleophoma empetri



Timing of applications 2015

- Delayed 1st fungicide application 50% in bloom

TRT	7-Jul	12-Jul	15-Jul	22-Jul	26-Jul	1-Aug	5-Aug	10-Aug	15-Aug	Apps.	
2	[Shaded]									5	
3		[Shaded]									5
4			[Shaded]								4
5				[Shaded]							3
6					[Shaded]						3
7						[Shaded]					2
8	Untreated									0	

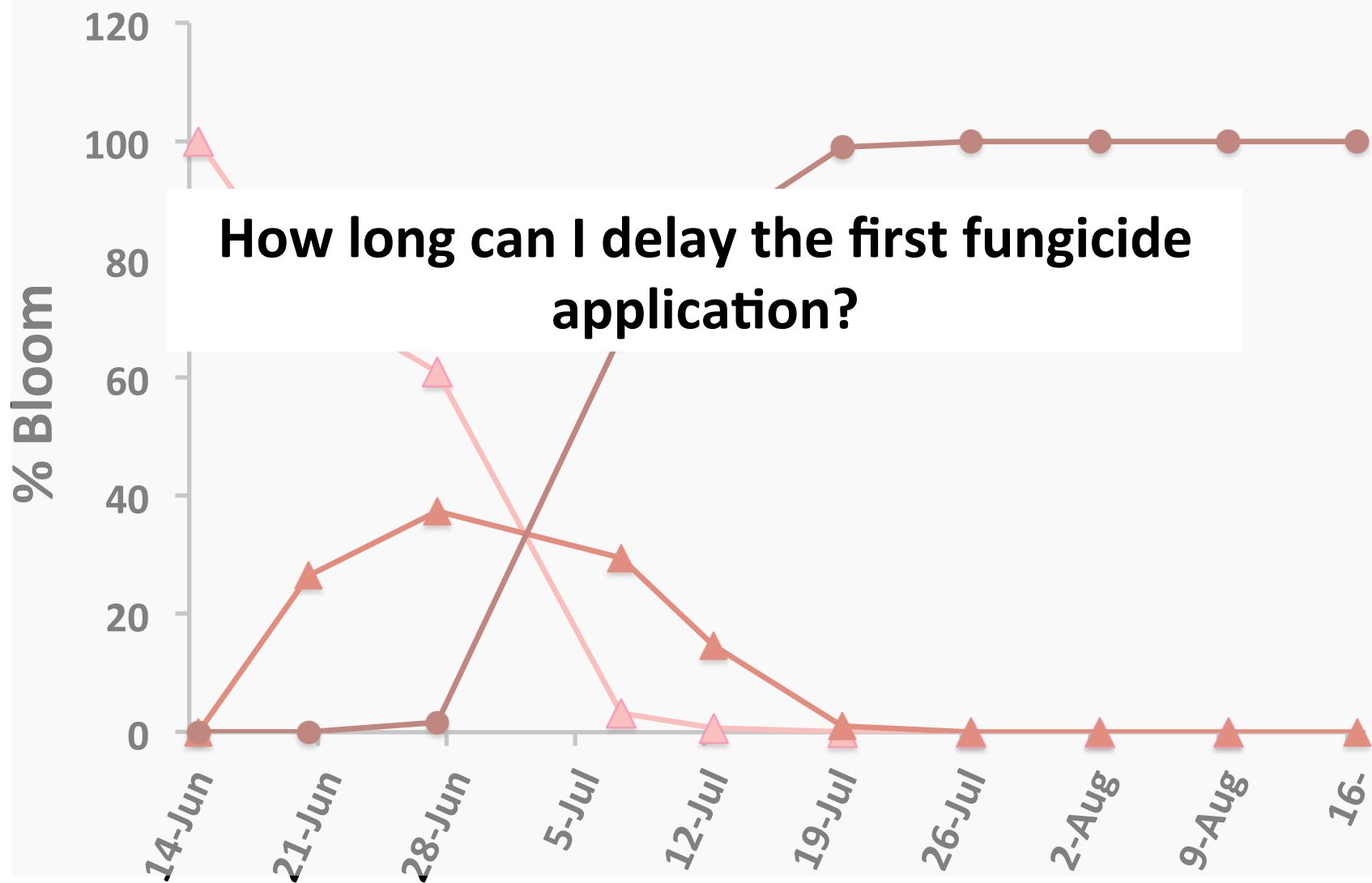
Timing of applications 2015

- Trial repeated in 2016
- Delayed 1st fungicide application 50% in bloom

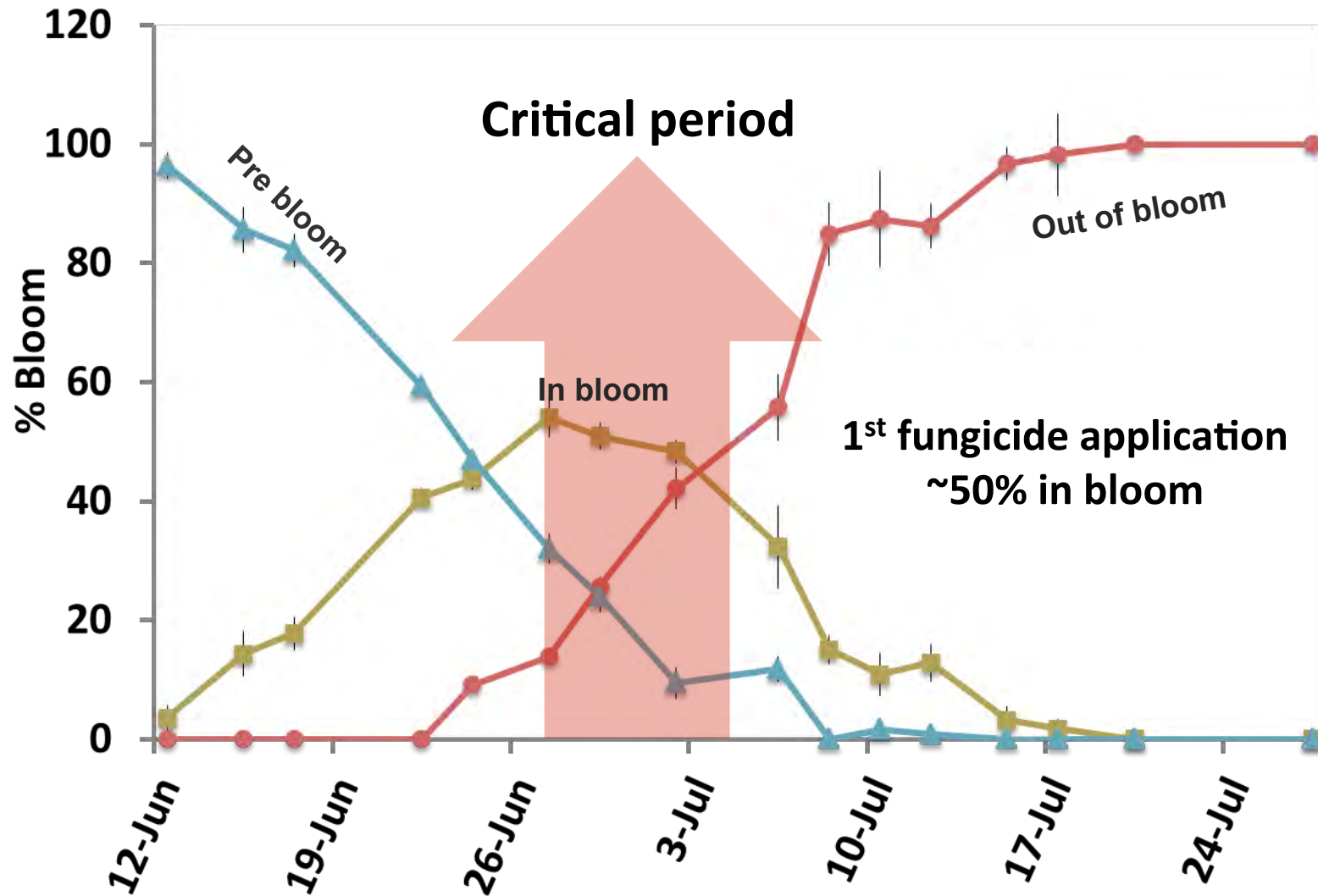
TRT	7-Jul	12-Jul	15-Jul	22-Jul	26-Jul	1-Aug	5-Aug	10-Aug	15-Aug	Apps.	
2										5	
3										5	
4										4	
5										3	
6										3	
7											2
8	Untreated									0	

Delayed & ↓# of apps

Timing of applications 2015



Results 2015 and 2016



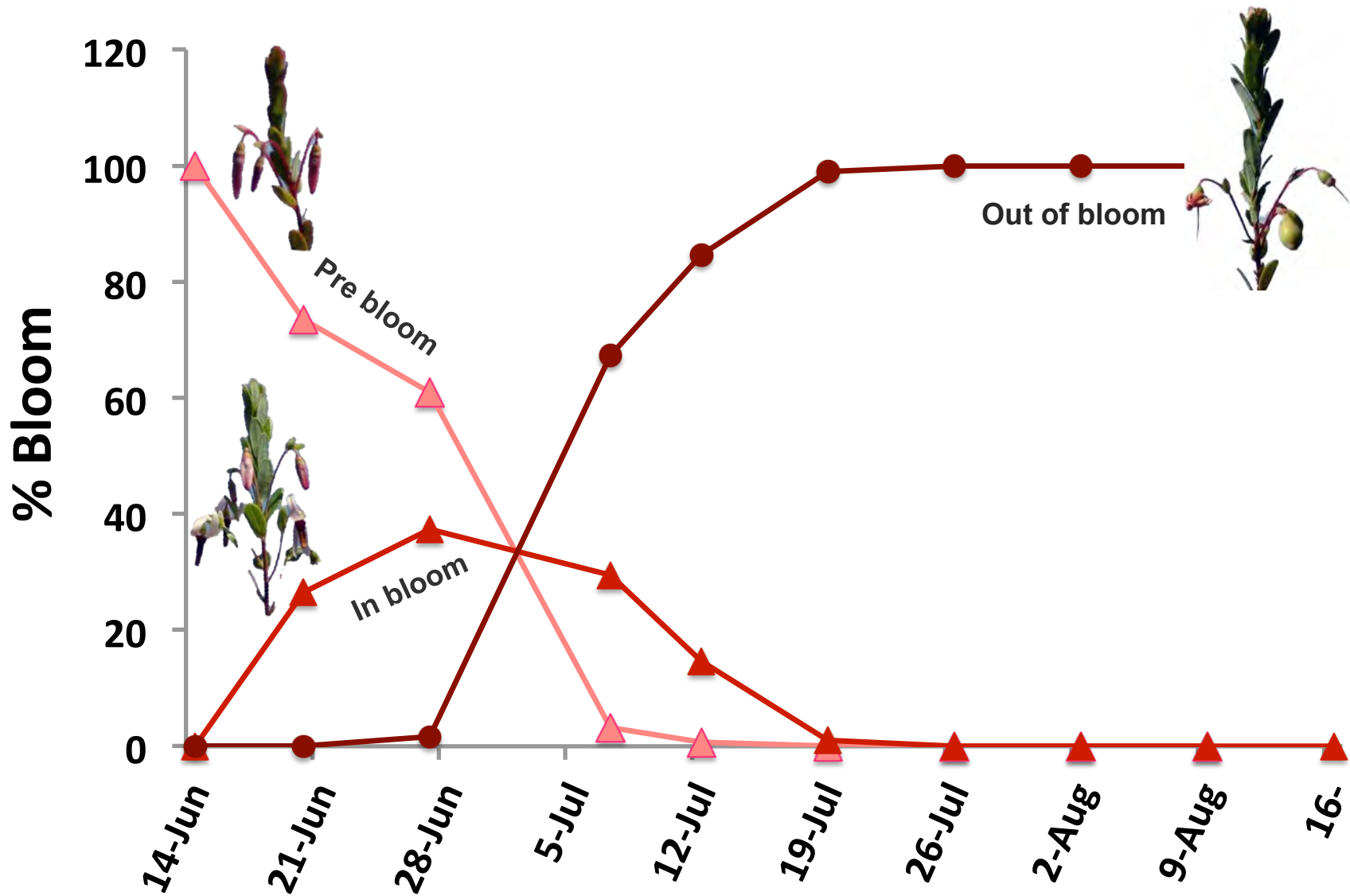
Timing of applications 2016

- Impact of delayed fungicide applications on fruit rot
- Early Black
- High disease pressure
- Up to 5 fungicide applications (Manzate and Bravo)

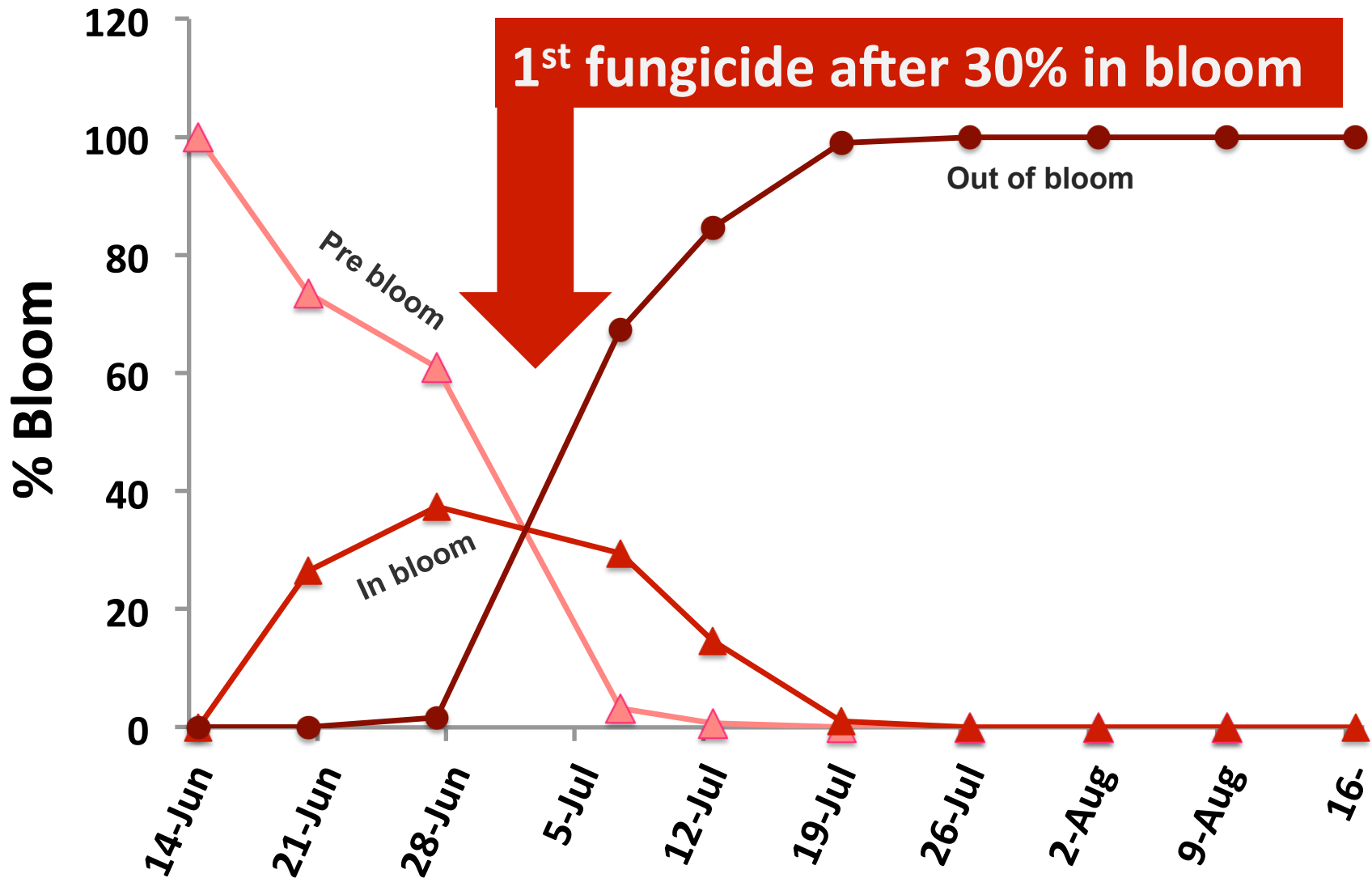


Timing of applications 2016

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Timing of applications 2016



Timing of applications 2016

1st fungicide after 30% in bloom

TRT	7-Jul	12-Jul	15-Jul	22-Jul	26-Jul	1-Aug	5-Aug	10-Aug	15-Aug	Apps.	
2										5	
3											
4											4
5											
6										3	
7											
8	Untreated									0	

Timing of applications 2016

1st fungicide after 30% in bloom, ~60% out of bloom

TRT	7-Jul	12-Jul	15-Jul	22-Jul	26-Jul	1-Aug	5-Aug	10-Aug	15-Aug	Apps.	
2										5	
3											
4											4
5											
6										3	
7											
8	Untreated									0	

Timing of applications 2016

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1st fungicide after 20% in bloom, ~80% out of bloom


TRT	7-Jul	12-Jul	15-Jul	22-Jul	26-Jul	1-Aug	5-Aug	10-Aug	15-Aug	Apps.
2	■	■	■	■	■	■	■	■	■	5
3		■	■	■	■	■	■	■		4
4	■	■	■	■	■	■	■			4
5		■	■	■	■	■				3
6	■	■	■	■	■					3
7		■	■	■						2
8										0

Untreated

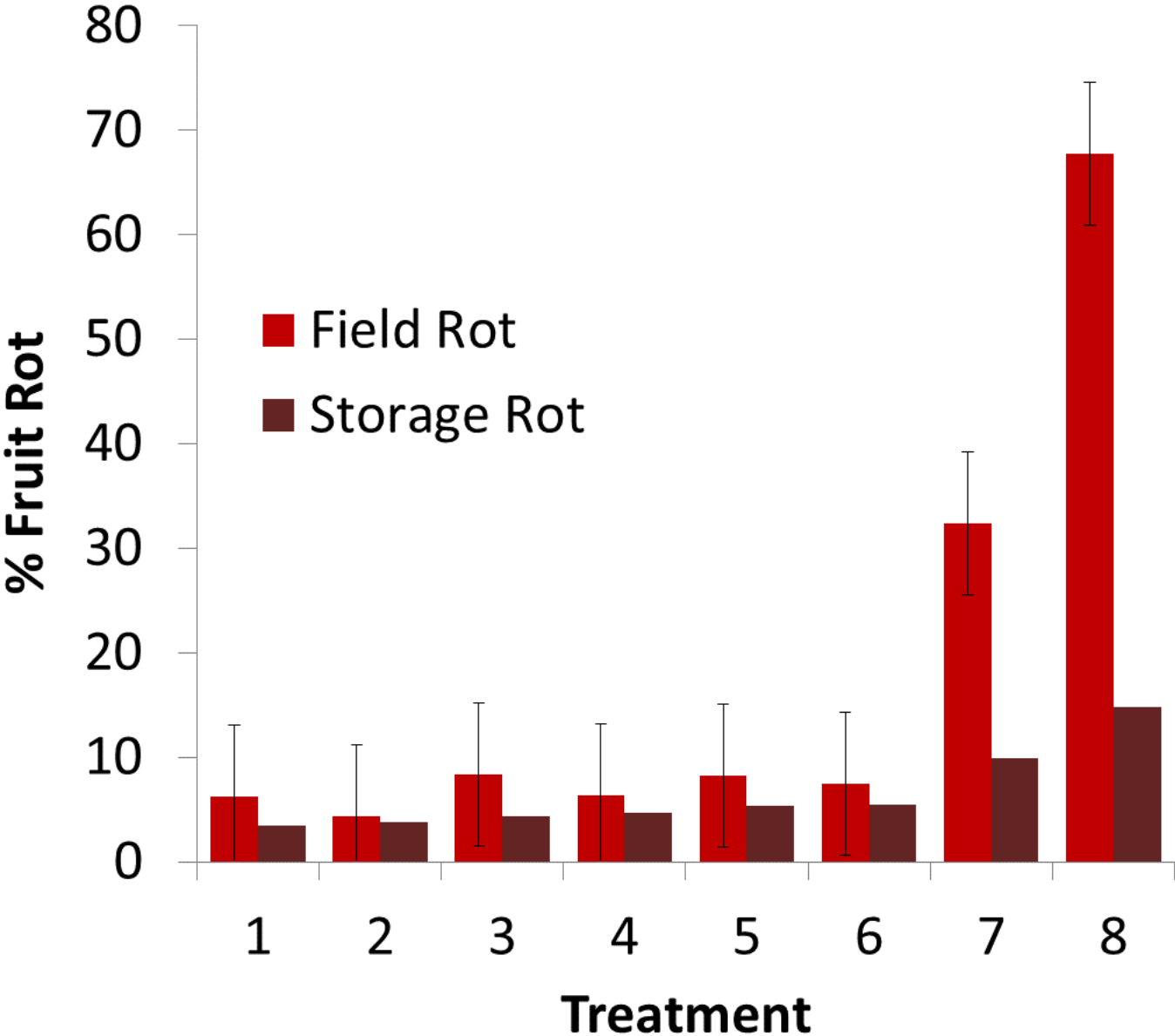
Timing of applications 2016

- First fungicide ~30% in bloom, ~60% out of bloom
- First fungicide ~20% in bloom, 80% out of bloom

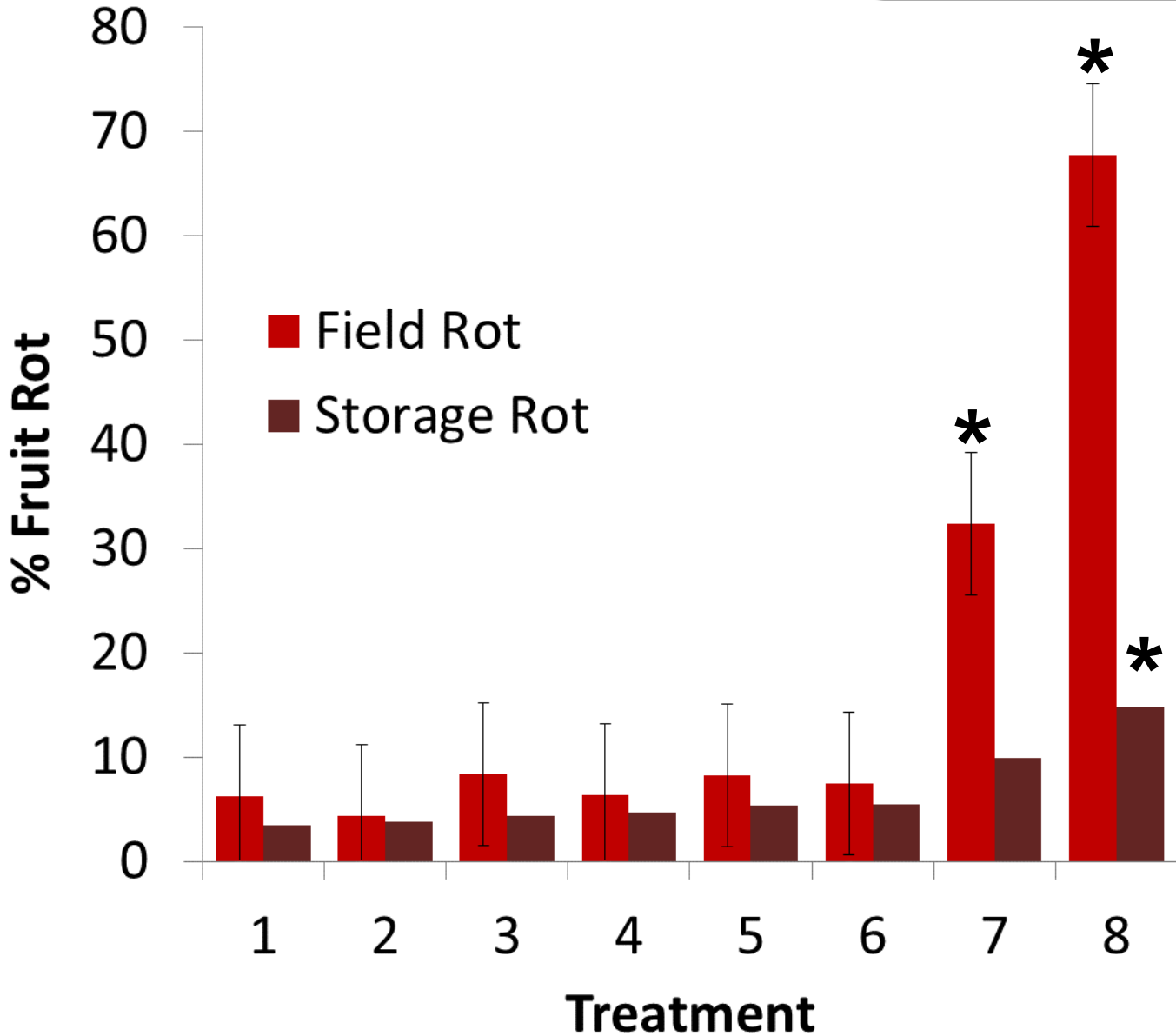
TRT	7-Jul	12-Jul	15-Jul	22-Jul	26-Jul	1-Aug	5-Aug	10-Aug	15-Aug	Apps.
2	[Shaded]									5
3		[Shaded]								4
4	[Shaded]									4
5		[Shaded]								3
6	[Shaded]									3
7		[Shaded]								2
8	Untreated									0



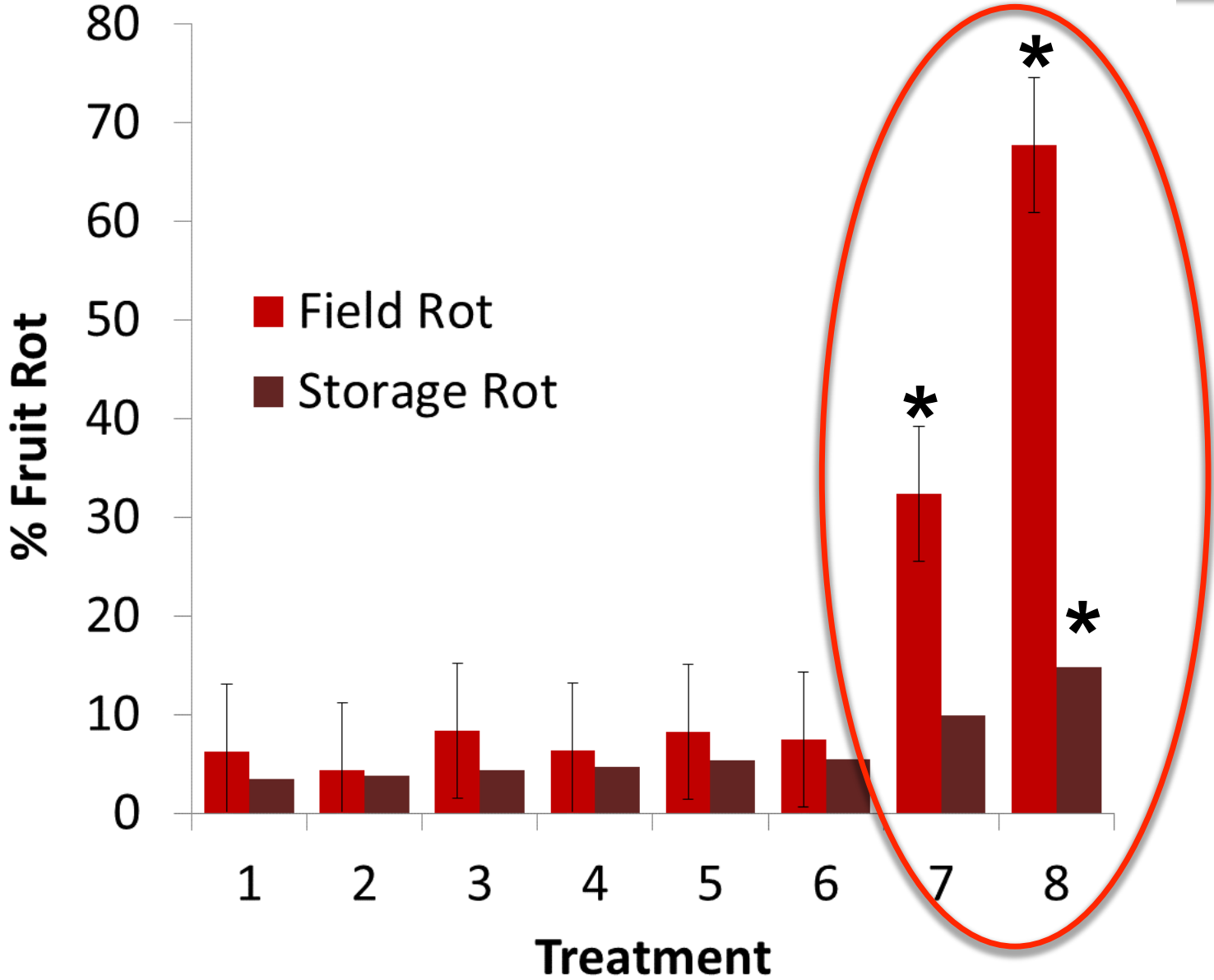
Results



Results 2016



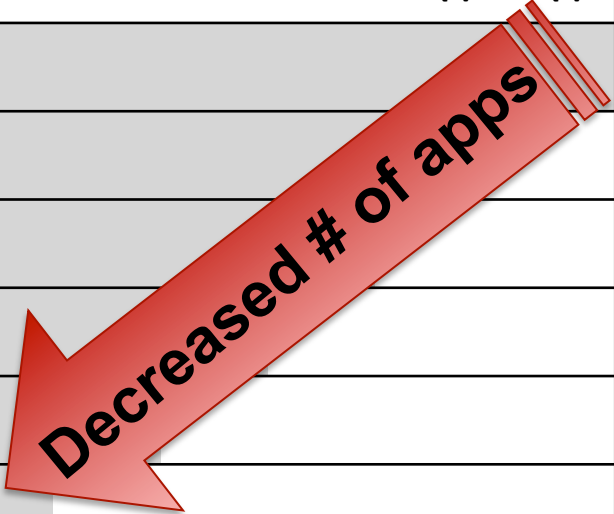
Results 2016



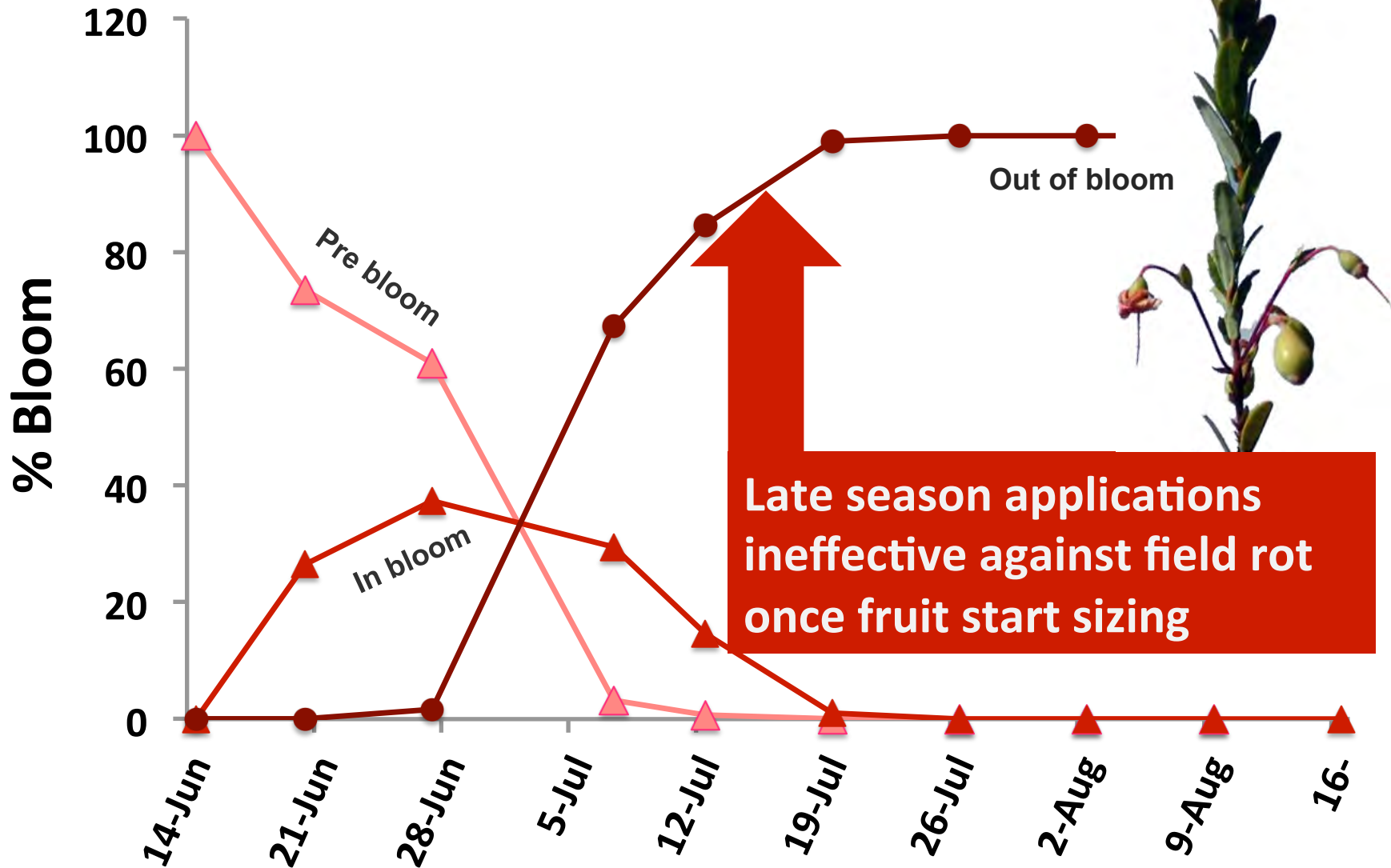
Results 2016

- First fungicide ~30% in bloom, ~60% out of bloom
- First fungicide ~20% in bloom, 80% out of bloom

TRT	Apps.	7-Jul	12-Jul	15-Jul	22-Jul	26-Jul	1-Aug	5-Aug	10-Aug	15-Aug	% Field Rot		
2	5											4.3 c	
3	4												8.4 c
4	4											6.4 c	
5	3												8.2 c
6	3											7.5 c	
7	2	2 applications										32.4 b	
8	0	Untreated										67.7 a	



Timing of applications 2016



Late season applications against storage rot

Cranberry Fruit Rot in the Northeast: A Complex Disease



Field Rot

Coleophoma empetri
Colletotrichum accutatum
Colletotrichum gloesporioides
Fusicoccum putrefaciens
Phomopsis vaccinii
Phyllosticta vaccinii
Physalospora vaccinii

Storage Rot

Allantophomopsis lycopodina
Allantophomopsis cytispora
Coleophoma empetri
Fusicoccum putrefaciens
Phyllosticta elongata
Phyllosticta vaccinii
Physalospora vaccinii
Strasseria geniculata



**Infection
only during
bloom & fruit
set?**

Late season applications against storage rot

TRT	Field Rot					Storage Rot						# Apps	
	Indar/Ab		Mancozeb			Oso (full rate)							
	X	X	X	X	X	X	X	X	X	X	X	X	11
1	X	X	X	X	X	X	X	X	X	X	X	X	9
2	X	X	X	X	X	X	X	X	X				7
3	X	X	X	X	X	X	X						5
4	X	X	X	X	X								4
5	X	X	X										3
6	Untreated											0	

- Stevens
- % Infected berries w/o symptoms (latent infections) at harvest
- % Field rot at harvest
- % Storage rot in November, January, March

Late season applications against storage rot

TRT	Field Rot					Storage Rot						% Field rot	% Storage rot 1	% Storage rot 2
	Indar/Ab		Mancozeb			Oso (full rate)								
1	X	X	X	X	X	X	X	X	X	X	X	8.4 ab	1.8	3.0
2	X	X	X	X	X	X	X	X	X			5.4 b	1.8	2.0
3	X	X	X	X	X	X	X					5.6 b	1.0	3.0
4	X	X	X	X	X							5.6 b	0.5	4.0
5	X	X	X									6.4 b	1.5	3.0
6	Untreated											17.7 a	6.5	8.0

Late season applications against storage rot

TRT	Field Rot					Storage Rot						% Field rot	% Storage rot 1	% Storage rot 2
	Indar/Ab		Mancozeb			Oso (full rate)								
1	X	X	X	X	X	X	X	X	X	X	X	8.4 ab	1.8	3.0
2	X	X	X	X	X	X	X	X	X			5.4 b	1.8	2.0
3	X	X	X	X	X	X	X					5.6 b	1.0	3.0
4	X	X	X	X	X							5.6 b	0.5	4.0
5	X	X	X									6.4 b	1.5	3.0
6	Untreated											17.7 a	6.5	8.0

Late season apps had no impact on field rot

Need more evaluations to determine impact on storage rot



Final thoughts

- What will fruit rot management look in the future?
 - Fungicide outlook
 - Canopy management
 - Biology of fungi



Preserving fruit quality

Improving bog side cleaning practices

Collaborators:

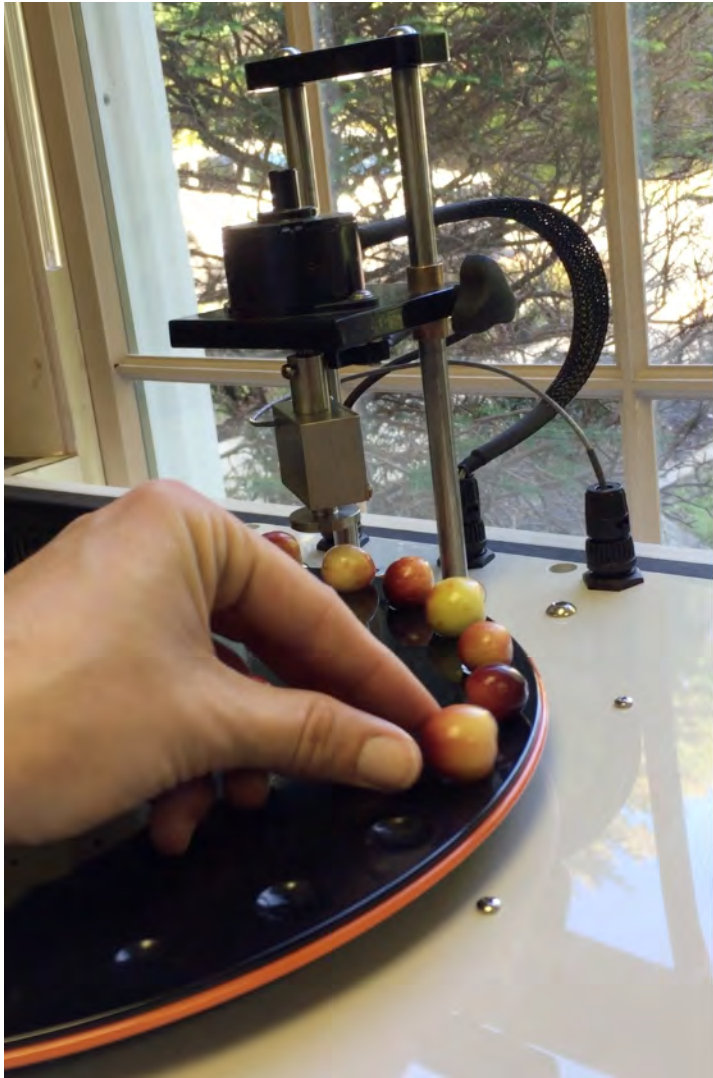
Rod Serres

David Nolte

Mariani

Premium Dried Fruit





Berry firmness

Healthy berries

n= 100 berries/sample



Ocean Spray and Center for Innovation Staff reviewing harvest and bog side cleaning practices.



Berry firmness

Healthy berries

n= 100 berries/sample

Stay tuned for 2016 summary in our next Newsletter



Ocean Spray and Center for Innovation Staff reviewing harvest and bog side cleaning practices.

Acknowledgements

2015 Summer Crew

- Tom Giorgio
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- Jared Hass
- Michael Kwang

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MakePeace
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Cranberry Station team

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