

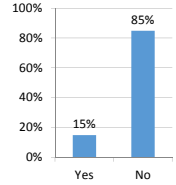
Managing Late Blight Approaching Harvest and into Storage



Jeff Miller, Miller Research
Phillip Wharton and Nora Olsen, University of Idaho

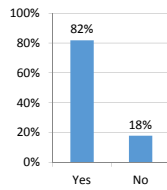
Is this late blight?

- 1. Yes
- 2. No



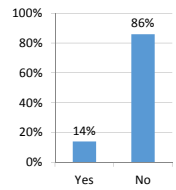
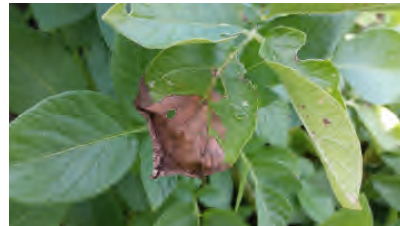
Is this late blight?

- 1. Yes
- 2. No



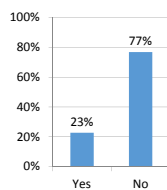
Is this late blight?

- 1. Yes
- 2. No



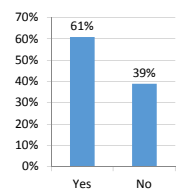
Is this late blight?

- 1. Yes
- 2. No



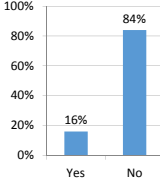

Is this late blight?

- 1. Yes
- 2. No



Is this late blight?

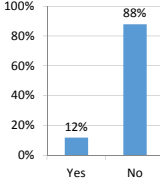

1.Yes
2.No



Response	Percentage
Yes	16%
No	84%

Is this late blight?

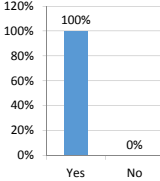

1.Yes
2.No



Response	Percentage
Yes	12%
No	88%

Is this late blight?

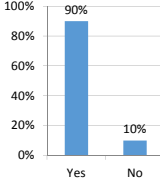

1.Yes
2.No



Response	Percentage
Yes	100%
No	0%

Is this late blight?

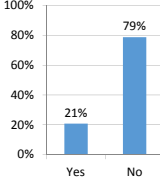

1.Yes
2.No



Response	Percentage
Yes	90%
No	10%

Is this late blight?

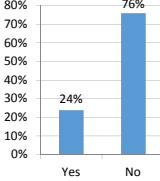
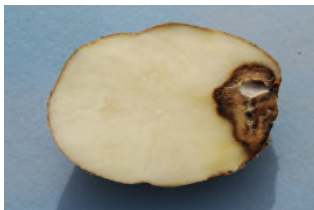
1.Yes
2.No



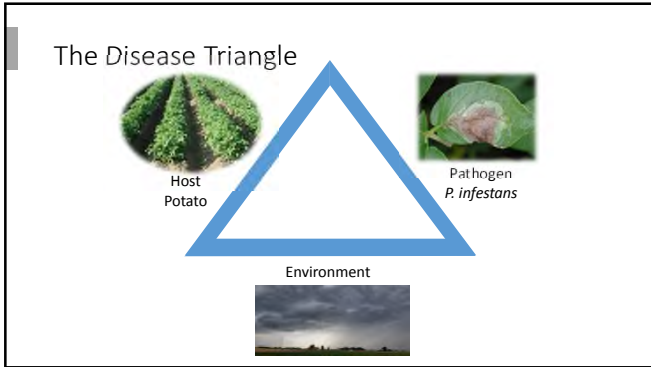
Response	Percentage
Yes	21%
No	79%

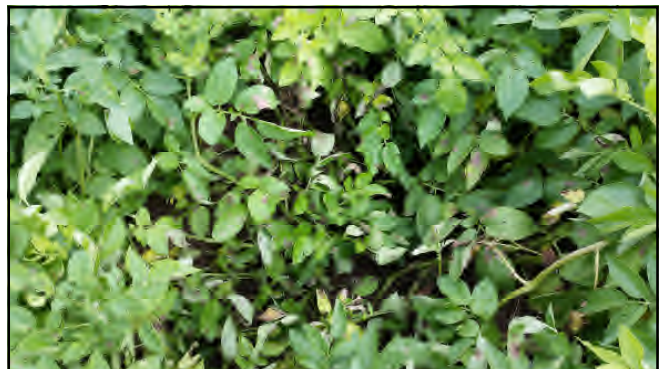
Is this late blight?

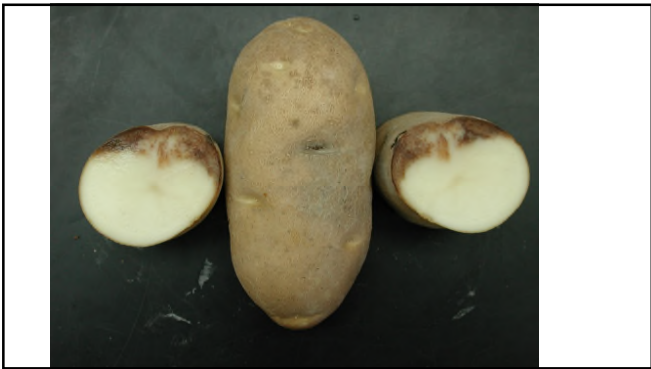
1.Yes
2.No

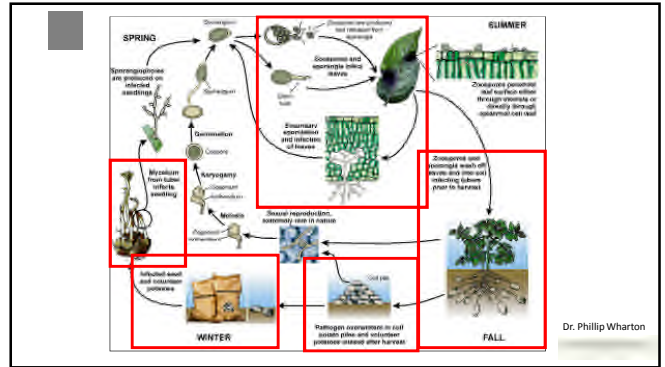


Response	Percentage
Yes	24%
No	76%









Host

- Potatoes (seed, culls, volunteers)
- Tomatoes
- Some Solanaceous weeds

Potato Cull Pile

Volunteers

Tomato

Recent genotypes of *P. infestans*

Summary of multilocus genotypes of *Phytophthora infestans* collected in the US and Canada, 2002-2009 (from Hu et al., Plant Dis. 2012 and Fry et al., APSnet Features 2012)

Genotype ^a	Host	Mating type	Allozyme genotype ^b		Sensitivity to mefenoxam ^c	mDNA haplotype ^d	RG57 RFLP ^e
			Gpi	Pep			
US-8 ^f	Potato	A2	100/111/122	100/100	IR	Ia	1,5,10,13,14,16,20,21,23,24,25
US-11	Potato/Tomato	A1	100/111	100/100	R	Ia	1,3,5,6,7,10,13,14,16,16,20,21,24,25
US-20	Tomato	A2	100/100	100/100	VR	Ia	1,3,5,7,10,13,14,16,16,20,21,24,25
US-21	Tomato	A2	100/122	100/100	SI/R	Ia	1,5,10,13,14,16,20,21,24,25
US-22 ^g	Potato/Tomato	A2	100/122	100/100	SI	Ia	1,5,13,14,16,20,21,24,25
US-23	Potato/Tomato	A1	100/100	100/100	SI	Ia	1,2,5,6,10,13,14,17,20,21,24,24a,25
US-24	Potato	A1	100/100/111	100/100	I	Ia	1,3,5,7,10,13,14,16,20,21,23,24,25

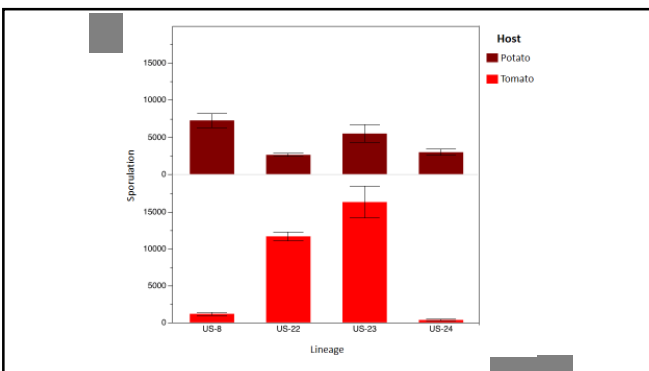
^fUS-23 caused the majority of potato and tomato late blight outbreaks in the Eastern US in 2009.

^aAllozyme genotyping done using methods of Goodwin et al. 1995.

^bS= mefenoxam sensitive, I= intermediate, R=resistant.

^cmDNA haplotype determined by the methods of Griffiths and Shaw 1998.

^dDNA fingerprinting by RFLP by methods of Goodwin et al. 1992.



Where has late blight been confirmed?

- Bingham
- Power
- Minidoka
- Bonneville
- Madison
- Fremont
- Cassia
- Jefferson
- Other places?

Fungicides Effective against Foliar Late Blight

Moderate activity

- Chlorothalonil
- Headline
- Mancozeb/metiram
- Quadris
- Reason

High activity

- Curzate/Tanos
- Forum
- Gavel/Zing!
- Omega
- Previcur
- Ranman
- Revus Top (Revus)
- Ridomil (Bravo, MZ, Cu)
- Super Tin
- Zampro



Use the rate labeled for late blight.

Penn State, 2012, US-23

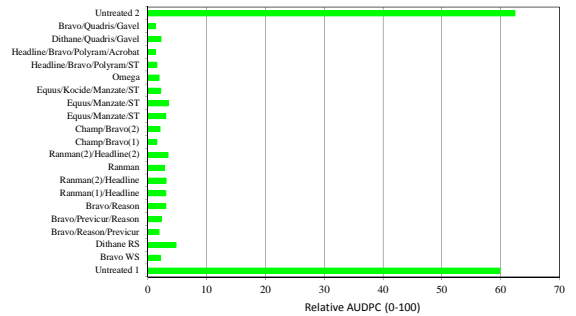
Aug 15	Aug 22	Aug 29	Sep 5	Sep 12	% Control
--	--	--	--	--	0
Bravo WS	Bravo WS	Bravo WS	Bravo WS	Bravo WS	73
Gavel	Gavel	Gavel	Gavel	Gavel	85
Zing!	Zing!	Zing!	Zing!	Zing!	82

Pathogen introduced August 17

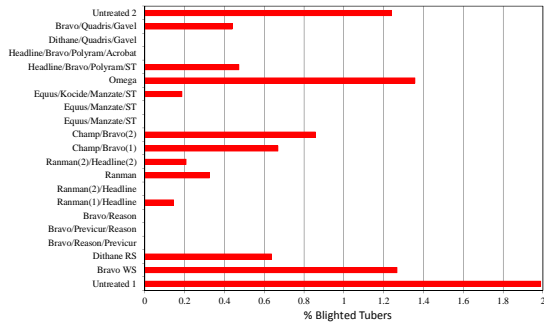
Michigan State, 2011, US-22

July 5	July 12	July 19	July 25	Aug 1	Aug 8	Aug 16	Aug 23	% LB Sep 14
--	--	--	--	--	--	--	--	100 a
Bravo WS	Bravo WS	Bravo WS	Bravo WS	Bravo WS	Bravo WS	Bravo WS	Bravo WS	9 bc
Gavel	Gavel	Gavel	Gavel	Gavel	Gavel	Gavel	Gavel	7 bcd
Bravo WS	Bravo WS	Bravo WS	Ranman	Ranman	Ranman	--	--	5 cde
Bravo WS	Revus Top	Bravo WS	Revus Top	Bravo WS	Revus Top	Bravo WS	Bravo WS	4 de
Bravo WS	Penncozeb	Bravo WS	Penncozeb	Bravo WS	Penncozeb	--	--	2 e
Ranman		Ranman		Ranman				

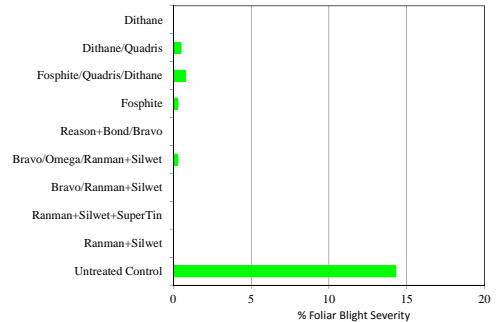
Pathogen introduced August 1



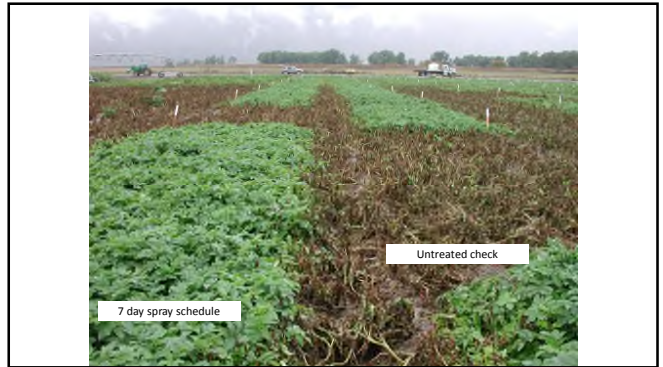
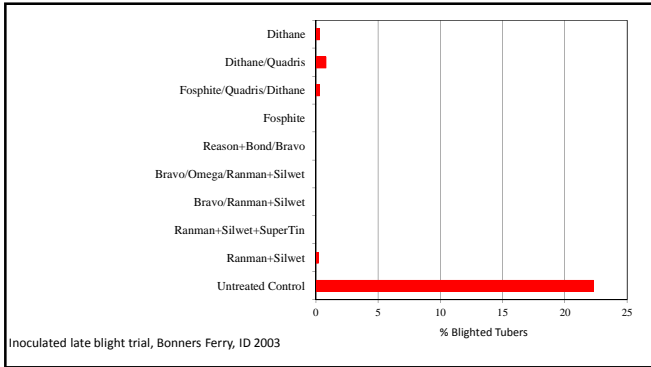
Inoculated late blight trial, Bonners Ferry, ID 2002



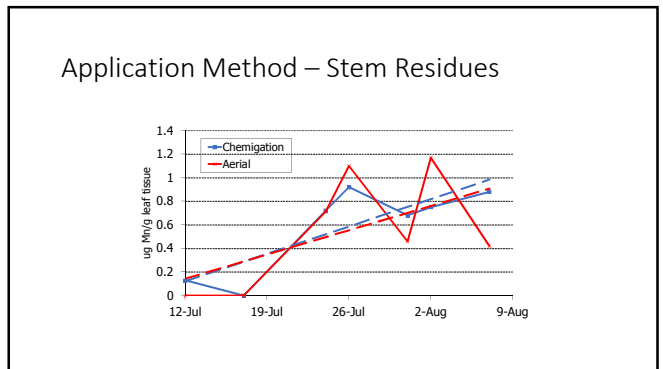
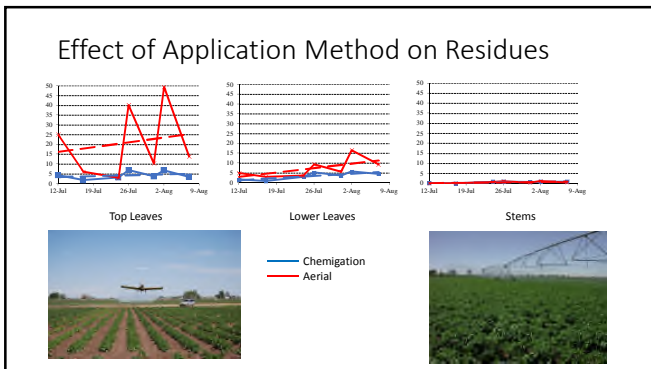
Inoculated late blight trial, Bonners Ferry, ID 2002



Inoculated late blight trial, Bonners Ferry, ID 2002



- ### Current Recommendations
- Blight is in your field
 - Kill any hot spots
 - Spray every 5-7 days
 - 5 days if weather is favorable (cool temps, thunderstorms)
 - 7 days if it is hot and dry
 - Treat tubers with phosphorous acid if they will be stored
 - Blight is in your county
 - Spray on a 7-10 day interval
 - 7 days if weather is favorable (cool temps, thunderstorms)
 - 10 days if it is hot and dry
 - If rain is coming, spray before the rain if at all possible.

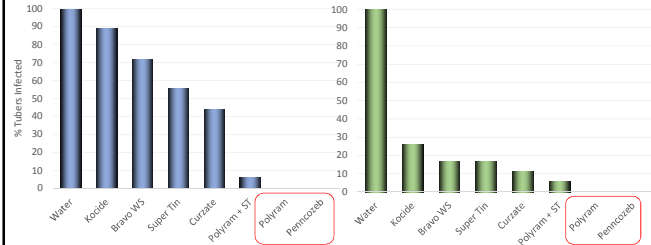


Late Blight Management:- Michigan Style

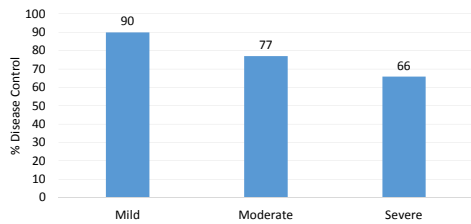


Soil-Applied Fungicides for Late Blight

L.D. Porter, et al., Plant Disease 90:964-968



Influence of Weather



From 1997 North American Late Blight Fungicide Trial
D. A. Inglis, M. L. Powelson, B. Gunderson, and M. Cappeart

Rumor

- The strain in Minidoka County is different than the one in Eastern Idaho. It can be controlled with Bravo.

Reality

- The strain in Minidoka County is the same as the one in Eastern Idaho. Bravo is moderately effective.

Rumor

- "We don't have late blight in our area. We are better farmers."

Reality

- Late blight can and will occur on farms that are managed very well if:
 - Inoculum is present
 - Weather is favorable.
- How "good" a farmer you are has little to do with it.

Rumor

- The fungicides are just not working. There is no value in spraying.

Reality

- The fungicides are working. Weather conditions have been ideal for pathogen spread.
- Remember the concept of the incubation period.

Rumor

- Once late blight is in your field, you cannot use Ridomil. But your neighbors can if they don't have blight.

Reality

- Fungicide resistance development is a real threat. But Ridomil has been used for a few years on US-23 with limited reports of resistance.
- Use a pre-pack or tank mix!

Rumor

- The University (of Idaho) has changed its stance on post-harvest treatment. They now are recommending _____.

Reality

- The most effective post-harvest treatment for late blight is a phosphorous acid fungicide. This recommendation has not changed.

Access our Resources:

- Checklist for Managing Late Blight Approaching Harvest



- Overview of Fungicides for Late Blight, 2015