

# Phosphorus Acid

## Applying What We Have Learned

Manitoba Potato Production Days 2015

Susan Ainsworth



# Outline

- Various products available
- Past research
- Frequently asked questions
  - Should I apply foliar or post harvest?
  - If applying foliar, what rate should I use and how many applications should I make?
  - Can I apply phosphorus acid to my seed potatoes?



Product	Formulation	Diseases	Uses; Rates	Precautions
Confine	45.8%	Suppression of late blight, pink rot, and silver scurf	Post harvest 17ml/cwt	Not recommended for use on potatoes intended for seed
Confine Extra	53%	Suppression of late blight, pink rot, and silver scurf	Foliar 2-4L/acre Post harvest 14.8ml/cwt	Not recommended for use on potatoes intended for seed Maximum 5 foliar applications per season
Confine Post	34%	Suppression of late blight, pink rot, and silver scurf	Post harvest 22.7ml/cwt	Not recommended for use on potatoes intended for seed
Phostrol	53.6%	Suppression of pink rot; Control of late blight	In-furrow, foliar & post harvest 2.3-4.7L/acre PR 1.2-4.7L/acre LB 19ml/cwt PH	Maximum 7 foliar applications per season
Rampart	53%	Control of late blight and pink rot	Post harvest or through humidification system 17.24ml/cwt	Maximum 1 application per year

# Past Research

- 2011-2013
- Collaborative effort between Gaia Consulting, Dr. Gefu Wang Pruski, Dalhousie University, and Dr. Fouad Daayf, University of Manitoba
- Industry and government funding



# Should I apply foliar or post harvest?

- How does Phosphorus acid work?
  - Directly by suppressing the growth of *Phytophthora* spp.
  - Indirectly by conferring resistance through stimulation of the plants natural defense mechanisms
- Will not cure potatoes that are already infected and symptomatic



# Should I apply foliar or post harvest?

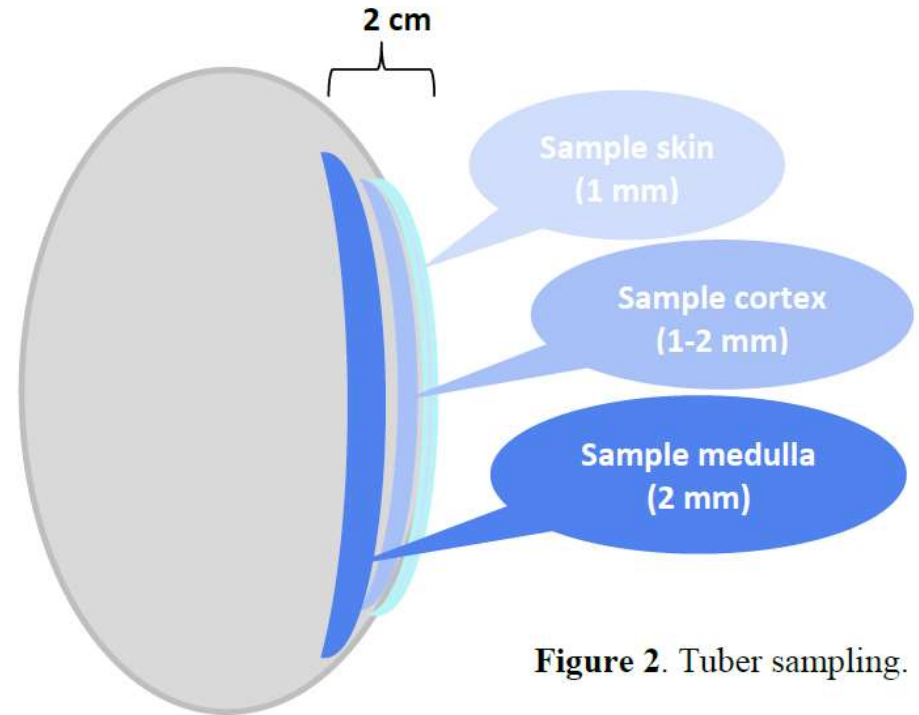
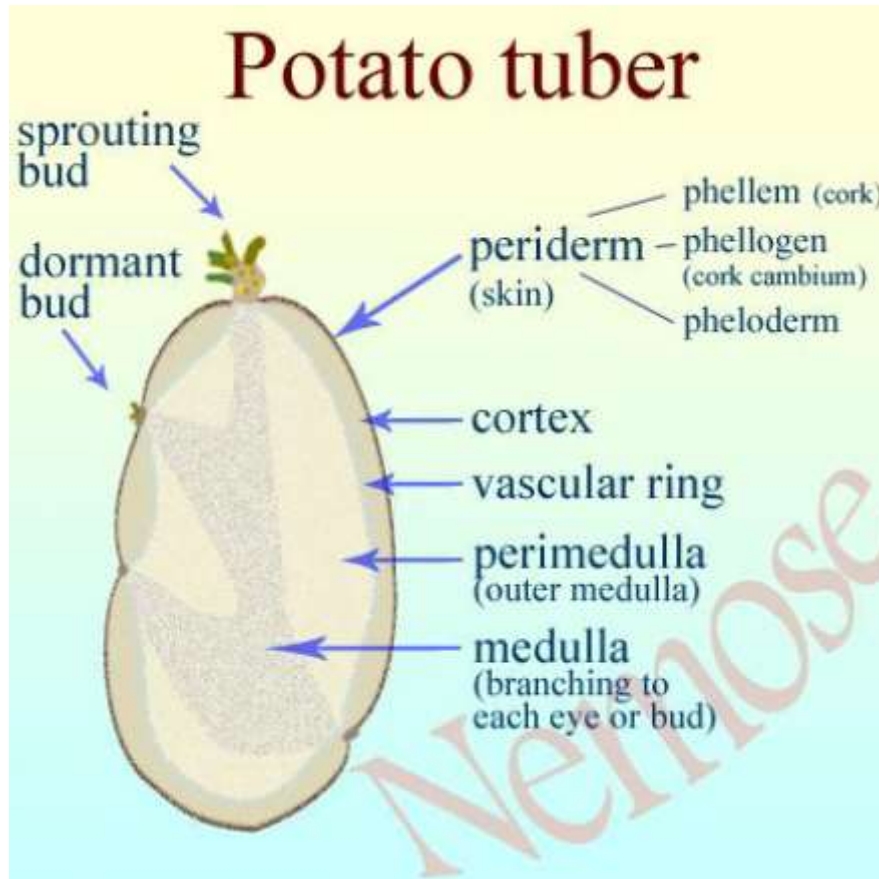
## If foliar, what rate & how many applications?

- Previous studies have indicated that levels  $>100\mu\text{g}$  phosphite/g fresh tissue are required to suppress *Phytophthora* spp.
- Literature suggests that many *P. infestans* strains are only significantly inhibited when phosphite concentrations are in excess of  $>200\mu\text{g/g}$ .



# PA Concentration & Distribution

(Wang-Pruski et al., 2012)



**Figure 2.** Tuber sampling.

2011:

- 3 applications of Confine = 57.34 $\mu\text{g/g}$  fresh tissue
- 2 applications of Confine = 38.9 $\mu\text{g/g}$  fresh tissue
- Post harvest Confine = 411 $\mu\text{g/g}$  fresh tissue

2012:

- 4 applications of Confine = 166.4 $\mu\text{g/g}$  fresh tissue
- 3 applications of Confine = 124.68 $\mu\text{g/g}$  fresh tissue
- 2 applications of Confine = 79.46 $\mu\text{g/g}$  fresh tissue
- Post harvest Confine = 659.47 $\mu\text{g/g}$  fresh tissue







(Adam & Daayf, 2012)



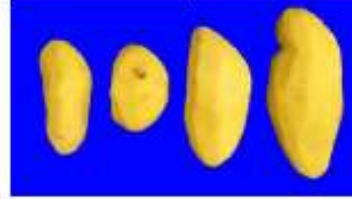
**Un-inoculated  
Check**

Rep.a

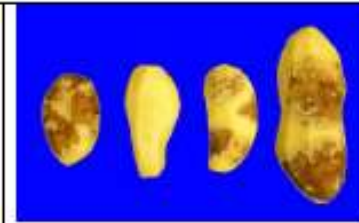
Rep.b

Rep.c

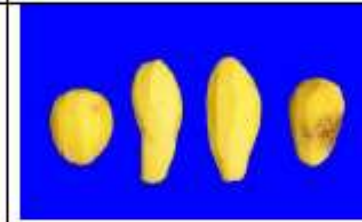
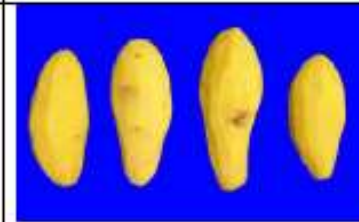
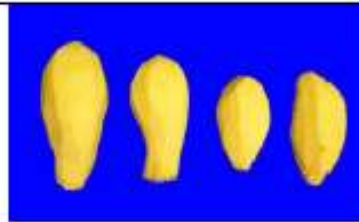
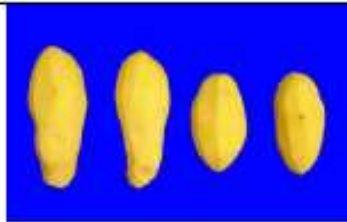
Rep.d



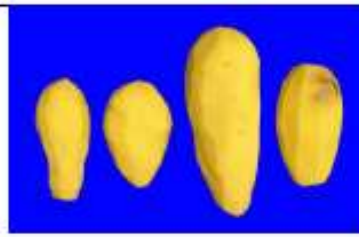
**Inoculated  
Check**



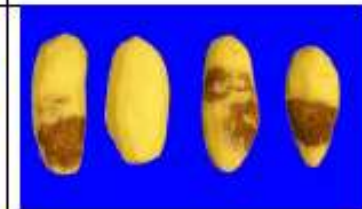
**Inoculated  
PH Treated**



**Inoculated  
3 field apps  
Confine**



**Inoculated  
2 field apps  
Confine**



# Should I apply foliar or post harvest?

## Other Considerations:

- Do not apply foliar during periods of crop stress.
- Consider tank mix compatibility
- Price
- Coverage is important when applying PH



# Can I apply phosphorus acid to my seed potatoes?

- Conflicting data
- Gaia Consulting
  - 2011: The post harvest application of Confine to seed delayed emergence but did not impact yield or fry quality.
  - 2012: Post harvest applications of both Confine and Phostrol delayed emergence, and resulted in fewer stems.



# Conclusions

## **Should I apply foliar or Post Harvest?**

- What are you trying to achieve?

## **If applying foliar, what rate should I use and how many applications should I make?**

- Minimum 3 applications
- > the amount of phosphorus acid applied > the concentration of phosphite in tubers > disease suppression/control.

# Conclusions

Can I apply phosphorus acid to my seed potatoes?



Questions?

