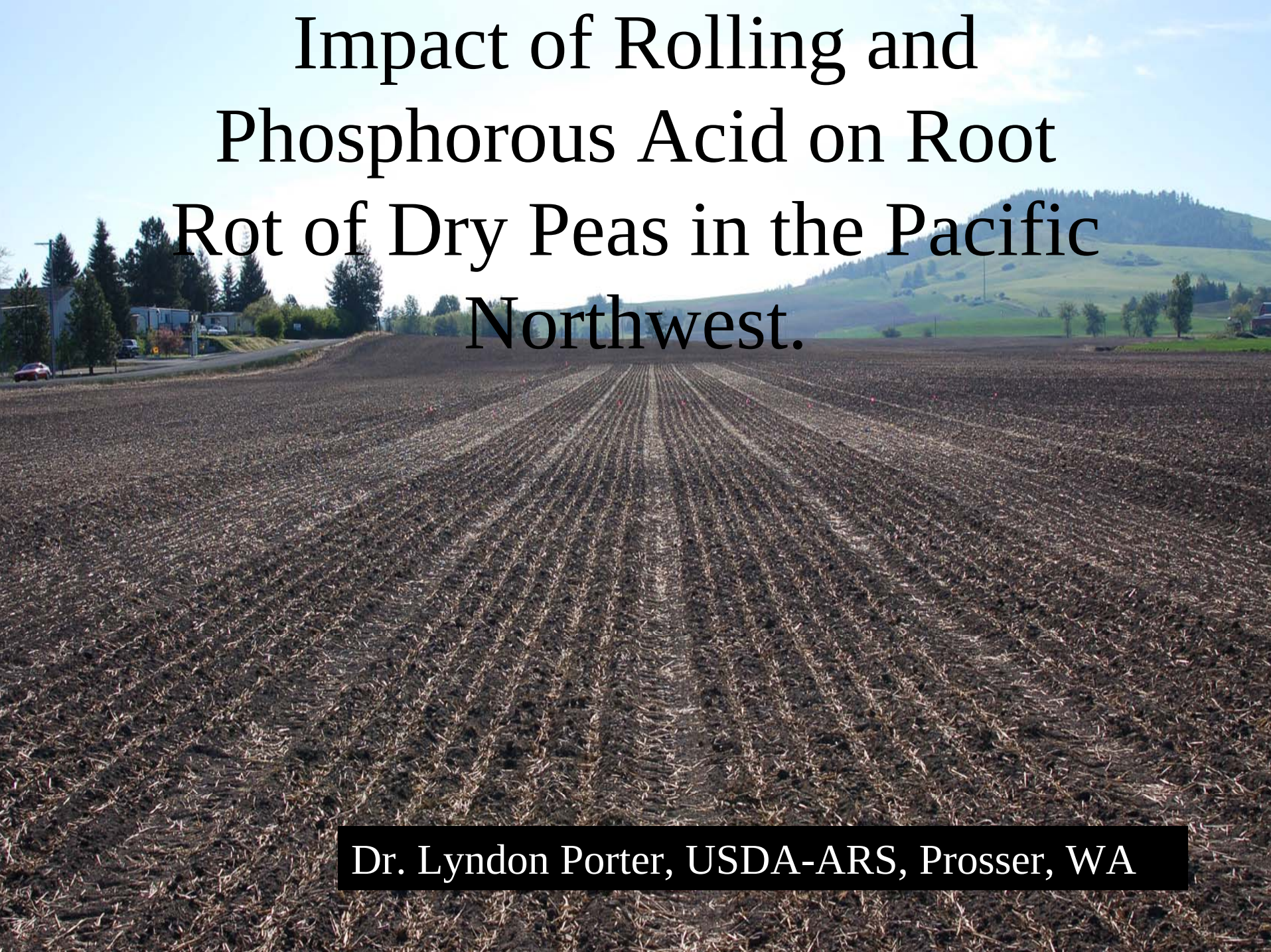
Impact of Rolling and Phosphorous Acid on Root Rot of Dry Peas in the Pacific Northwest.



Dr. Lyndon Porter, USDA-ARS, Prosser, WA

Benefits of Rolling

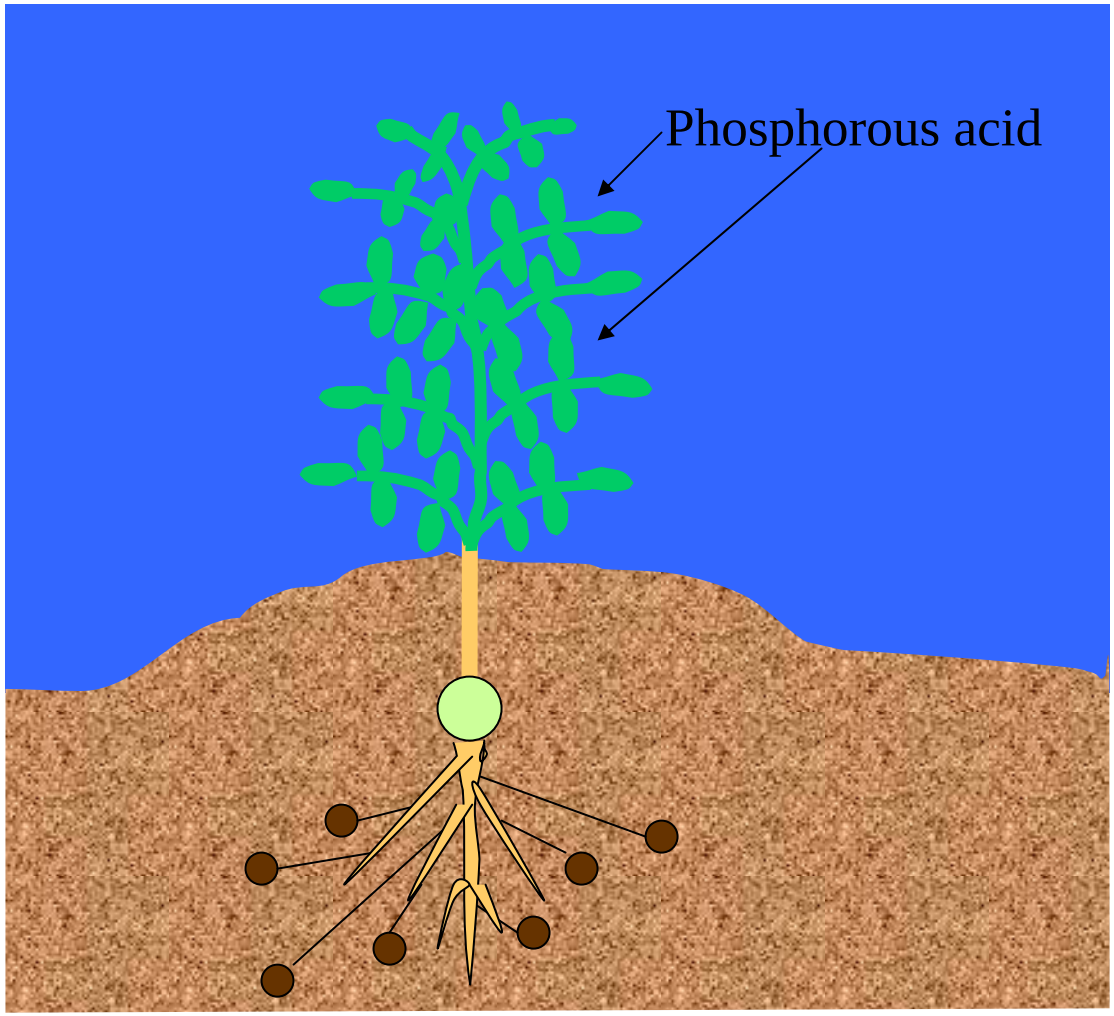
- Cleaner harvest. Reduces the collection of dirt clods, rocks and soil at harvest by leveling the field.
- Easier harvest. If peas lodge it is easier to harvest peas from a level surface.

Photo Courtesy NDSU Carrington Reseach Extension Center

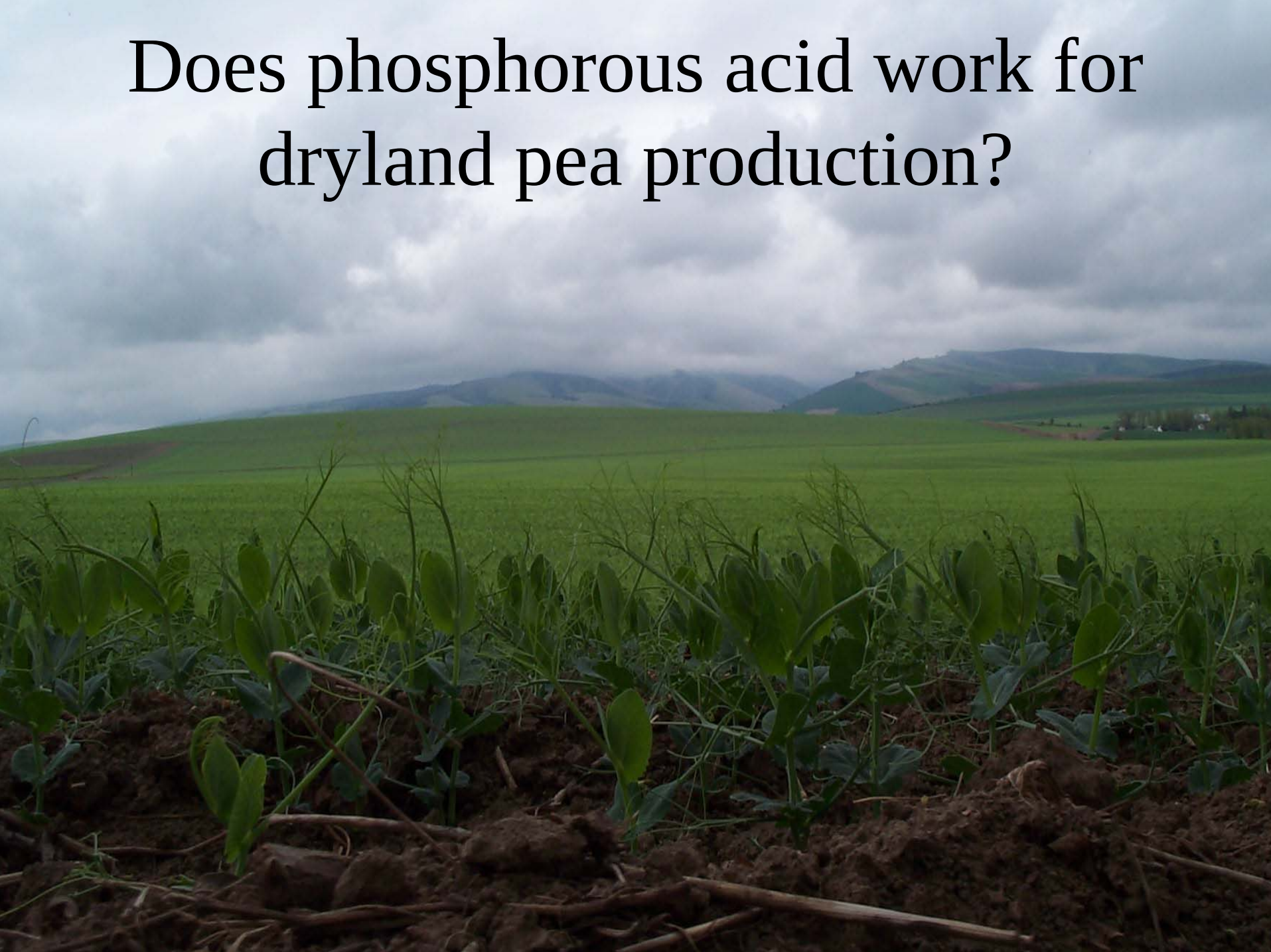
Impacts of Soil Compaction on Plant Health

- Reduces or slows plant emergence
- Restricts root development and growth
- Lowers oxygen in root zone
- Restricts water percolation
- Favors Aphanomyces and Pythium root rot and other soil pathogens
- Promotes build up of pathogens over time

Soilborne Pathogens of Peas



Does phosphorous acid work for dryland pea production?

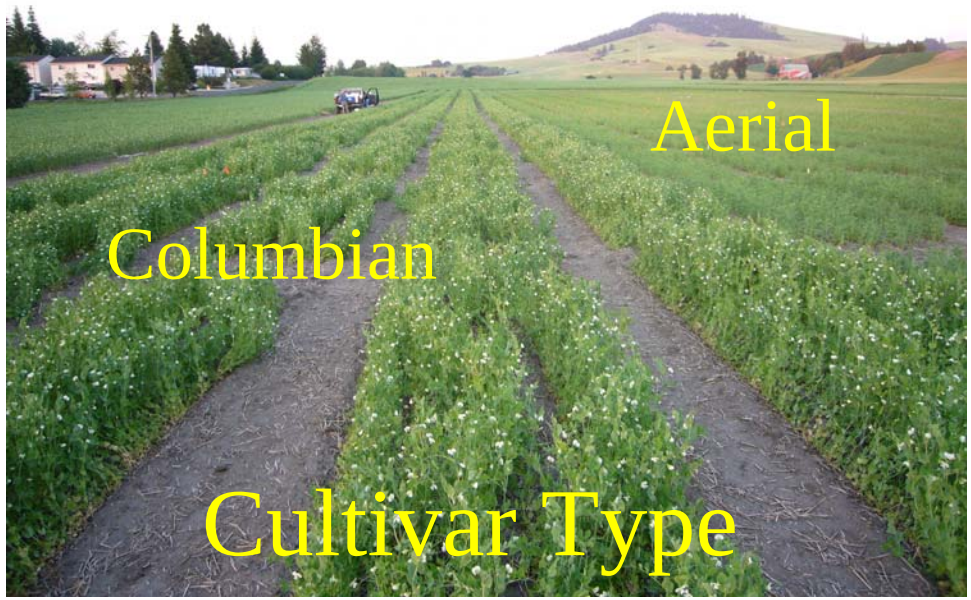


Foliar applications

Phostrol

2.5 and 4 pints/acre

(phosphorous acid)



Parameters measured

- Seed germination rates
- Root disease severity
- Plant height at bloom*
- Foliage dry weight
- root dry weight
- Yield*

Application timing

- Avoid a second application cost by tank mixing with an insecticide.
- Apply a single application of phosphorous acid at the 3rd to 5th node growth stage.
  - Same time you would apply an insecticide to manage pea leaf weevil.
  - *Aphanomyces euteiches* and *Pythium* spp. infect early.

Plant height

- Kendrick, Columbian: All but one Phostrol treatment significantly increased plant height over commercial standard (CS). (2.5 pints, 5.18 in. taller, greatest)
- Kendrick, Aerial: 2.5 pint Phostrol treatment significantly increased plant height over CS. (1.8 in. taller)
- Moscow, Columbian: 2.5 pint Phostrol treatment increased plant height over CS. (1.38 in. taller)
- Moscow, Aerial: 2.5 pint Phostrol treatment significantly increased plant height over CS. (2.0 in. taller)

Pea Economics

- Cost of the seed treatment = $5.50/acre
- Cost of 2.5 pints of Phostrol per acre = $5.63/acre (At $18.00/gallon)
- Phosphorous acid tank-mixed with insecticide to avoid second application cost.
- Extra 81 lb of seed produced per acre to cover cost of Phostrol at $7.00 per cwt.

Yield (lb/acre)

Kendrick, ID Columbian	Kendrick, ID Aerial	Moscow, ID Columbian	Moscow, ID Aerial
1.NR/TS/2.5P 903	NR/TS/2.5P 824*	R/TS/2.5P 1197	R/TS/2.5P 1086**
Standard 781	Standard 491	Standard 1075	Standard 867
122 lb Difference in Yield	333 lb Difference in Yield	122 lb Difference in Yield	219 lb Difference in Yield
$7.00/cwt- $5.63	$6.75/cwt - $5.63	$7.00/cwt- $5.63	$6.75/cwt - $5.63
Net Profit $2.91/acre	Net Profit $16.85/acre	Net Profit $2.91/acre	Net Profit $9.15/acre

Impact of phosphorous acid on Aphanomyces root rot of dry pea

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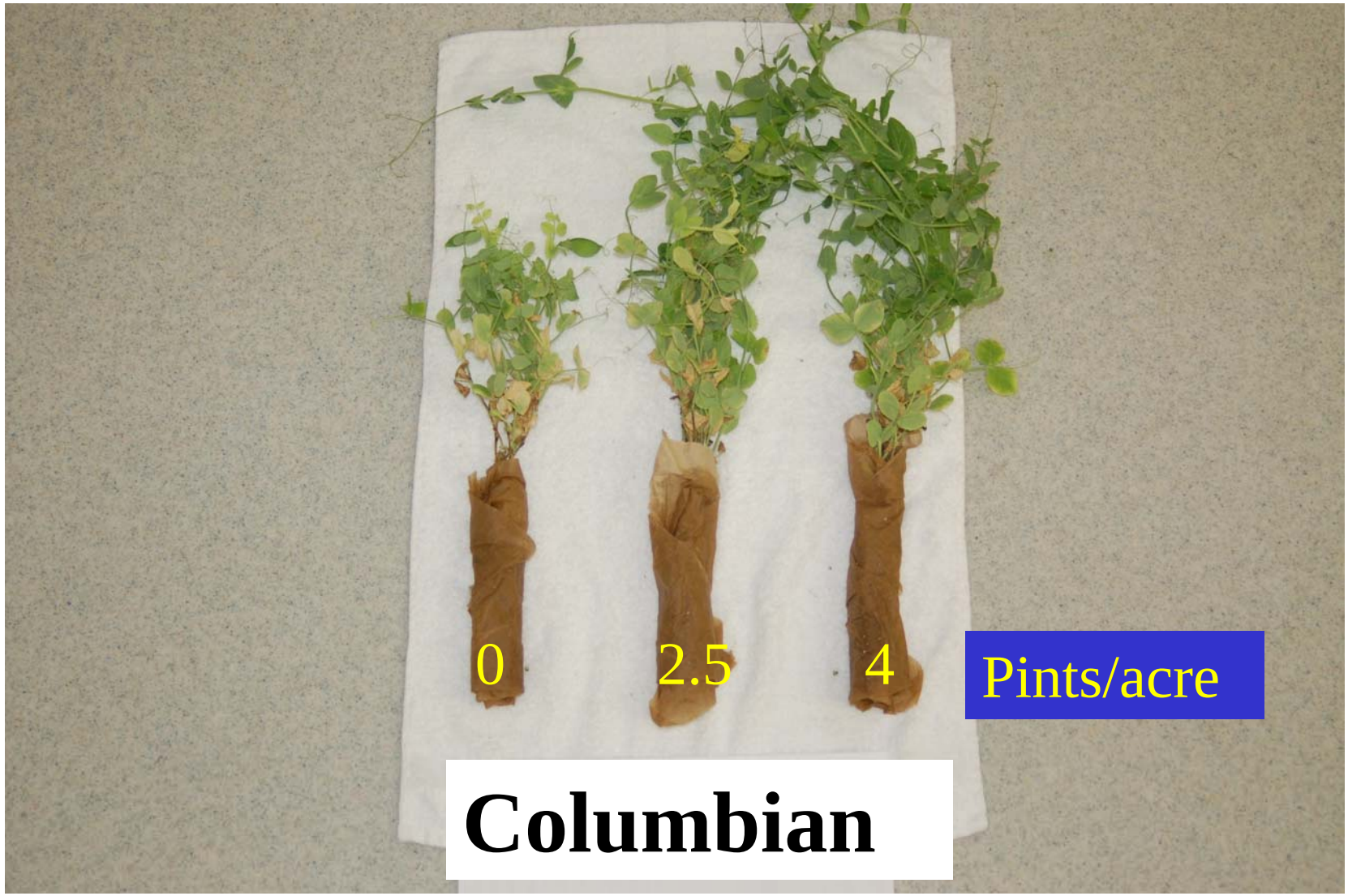
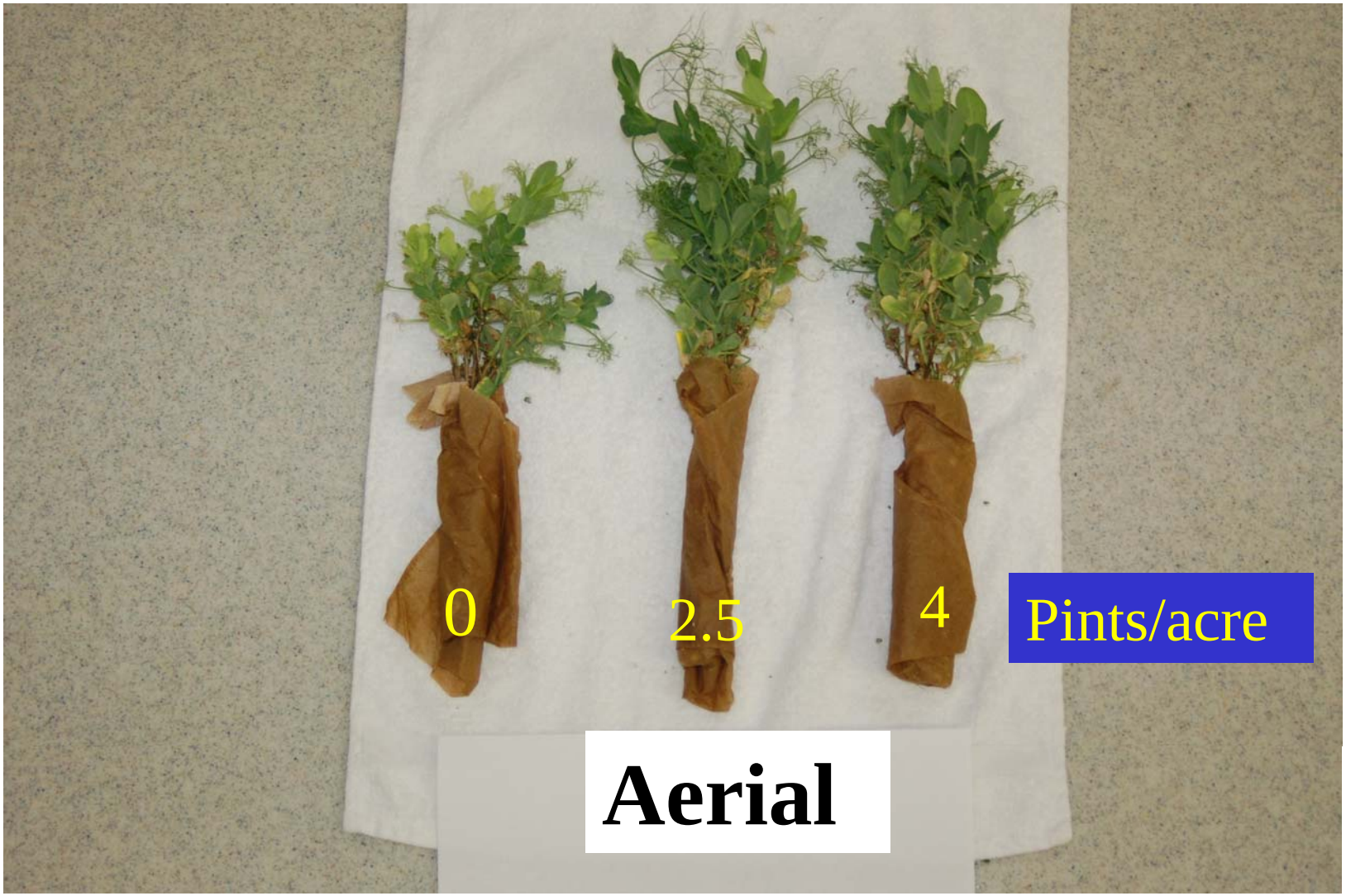
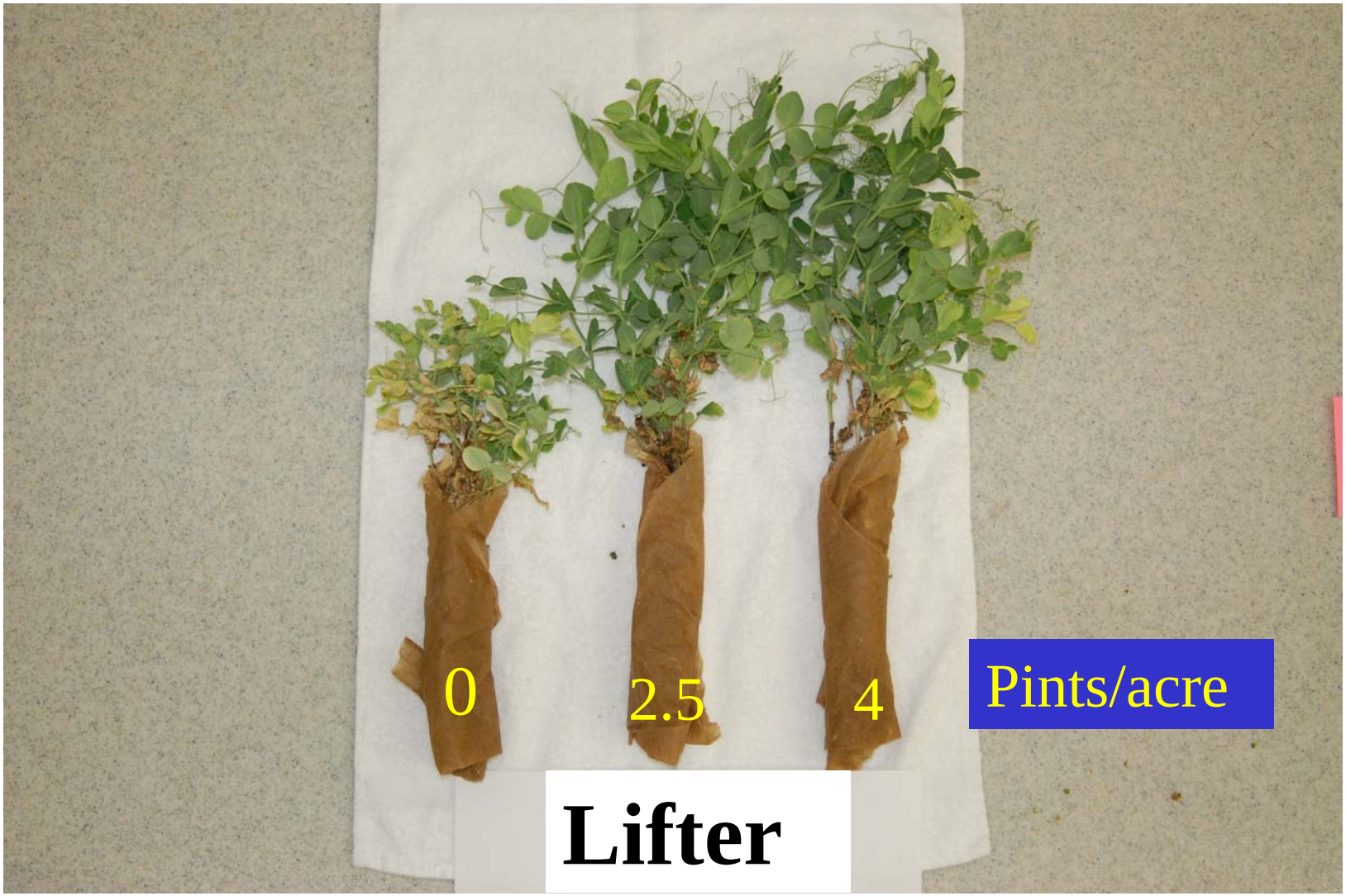


Impact of phosphorous acid on Aphanomyces root rot of dry pea



Impact of phosphorous acid on Aphanomyces root rot of dry pea



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Conclusions

- Phosphorous acid significantly increased plant height of both Columbian and Aerial cultivars in the field.
- Phosphorous acid appears to have a big impact on yield of semi-leafless dry pea varieties and their susceptibility to root pathogens.
- Phosphorous acid significantly improved the protection of six of six commercial cultivars to Aphanomyces root rot in greenhouse trials.
- Phosphorous acid appears to be an economically viable solution to help manage the root rot complex in dry peas.
- Will it work in lentils? Not registered.

Questions?