



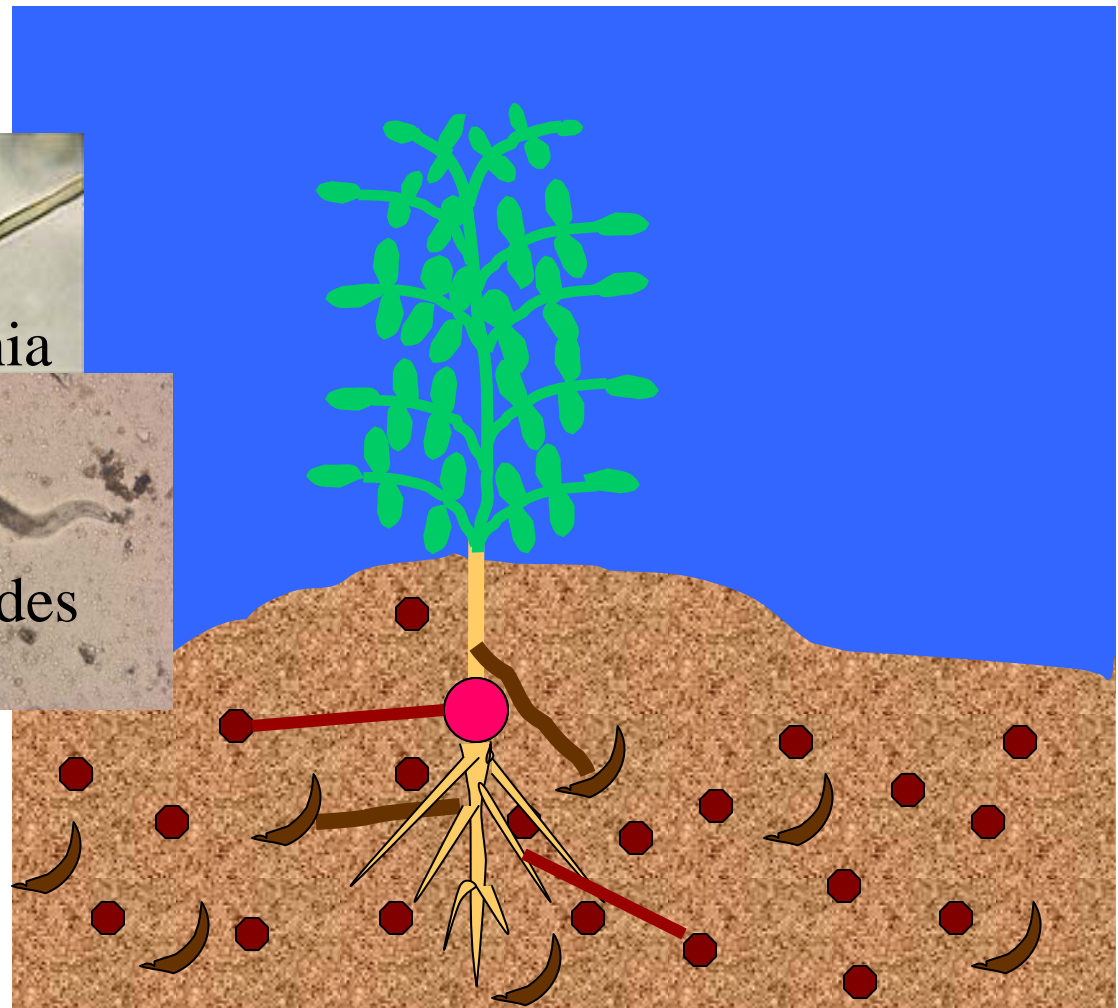
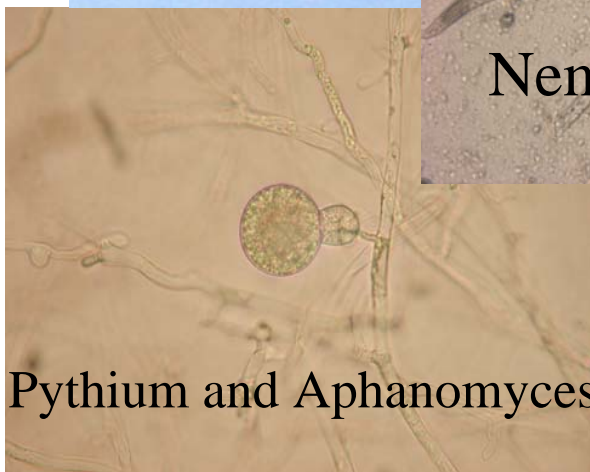
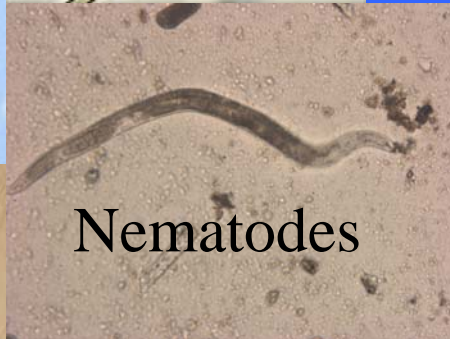
Effects of Different Lime Applications on Green Peas on the Blues

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

Dr. Rich Koenig: Washington State University

Tom Darnell: Oregon State University

Soilborne Pathogens of Legumes



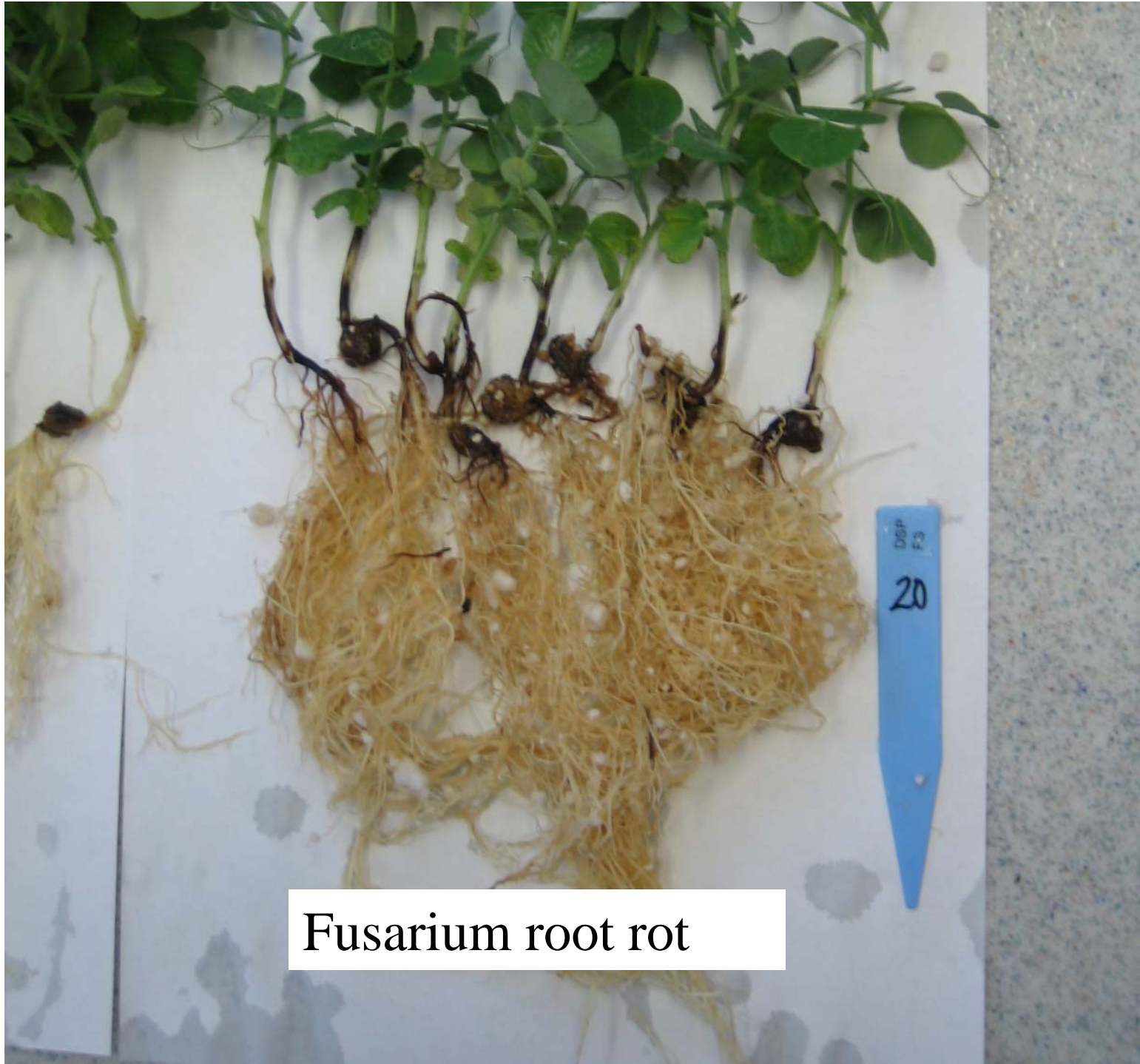


Aphanomyces root rot



Root Lesion Nematode infected roots

More prominent in peas and wheat following chickpeas



Fusarium root rot

Objectives of Research

- Identify the impact of liming on root diseases and yield.



Reasons to Lime

- Low soil pH can negatively impact pea plant health
 - Peas are moderately tolerant to acidity (pH of 5.5 to 6.5)
- Stresses to plants can make them more susceptible to disease.
- Optimum soil pH for peas is 6 to 7
 - Better nitrogen fixation of *Rhizobium*
 - Low pH can induce manganese and aluminum toxicity (<5)
 - Acid soils can cause deficiencies in calcium, magnesium, phosphate and molybdenum

Minimum pH for Growth

- Lentils 5.65
- Peas 5.52
- Chickpeas ?
- Winter wheat 5.37
- Barley 5.23
 - Mahler and McDole, UI
- Alfalfa 6.3

Don Horneck, OSU

Materials and Methods

- Location: Milton Freewater, OR
- Dryland farm for processing pea production
- Soil type: Athena silt loam
- Soil pH around 5.5.
- Variety: Serge planted at 161 lb/acre
- Drill: Anderson Horsch Direct Seeding Drill
- Planting depth 2”
- Between row spacing: 9.0 inches
- Within row spacing: 2 inches
- Plot sizes 20 x 40 feet
- Calpril used as lime source (Crushed limestone).
Pacific Calcium Inc.



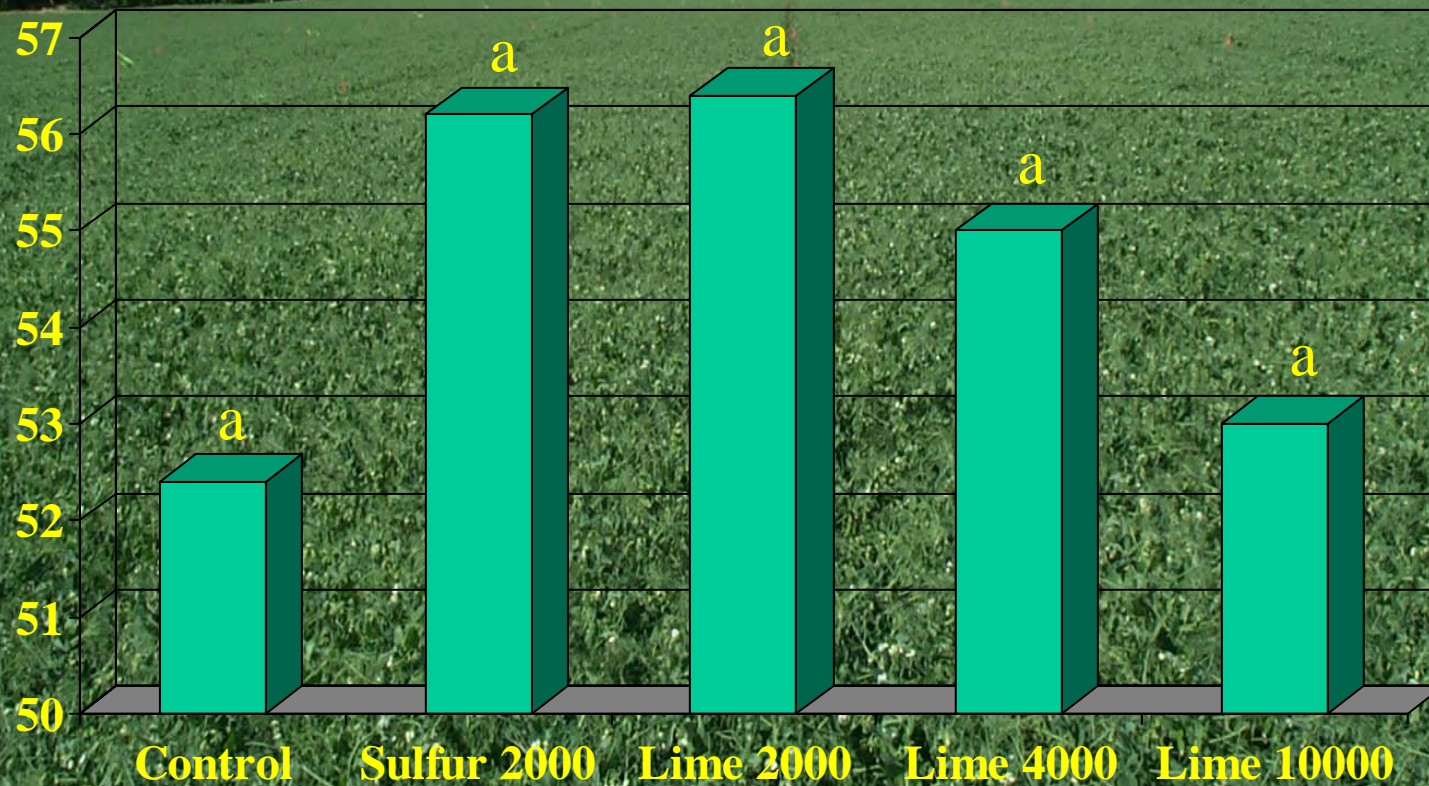
Fall application of treatments

Non-treated control
Lime @ 10000 lb/acre
Lime @ 4000 lb/acre
Lime @ 2000 lb/acre
Sulfur @ 2000 lb/acre

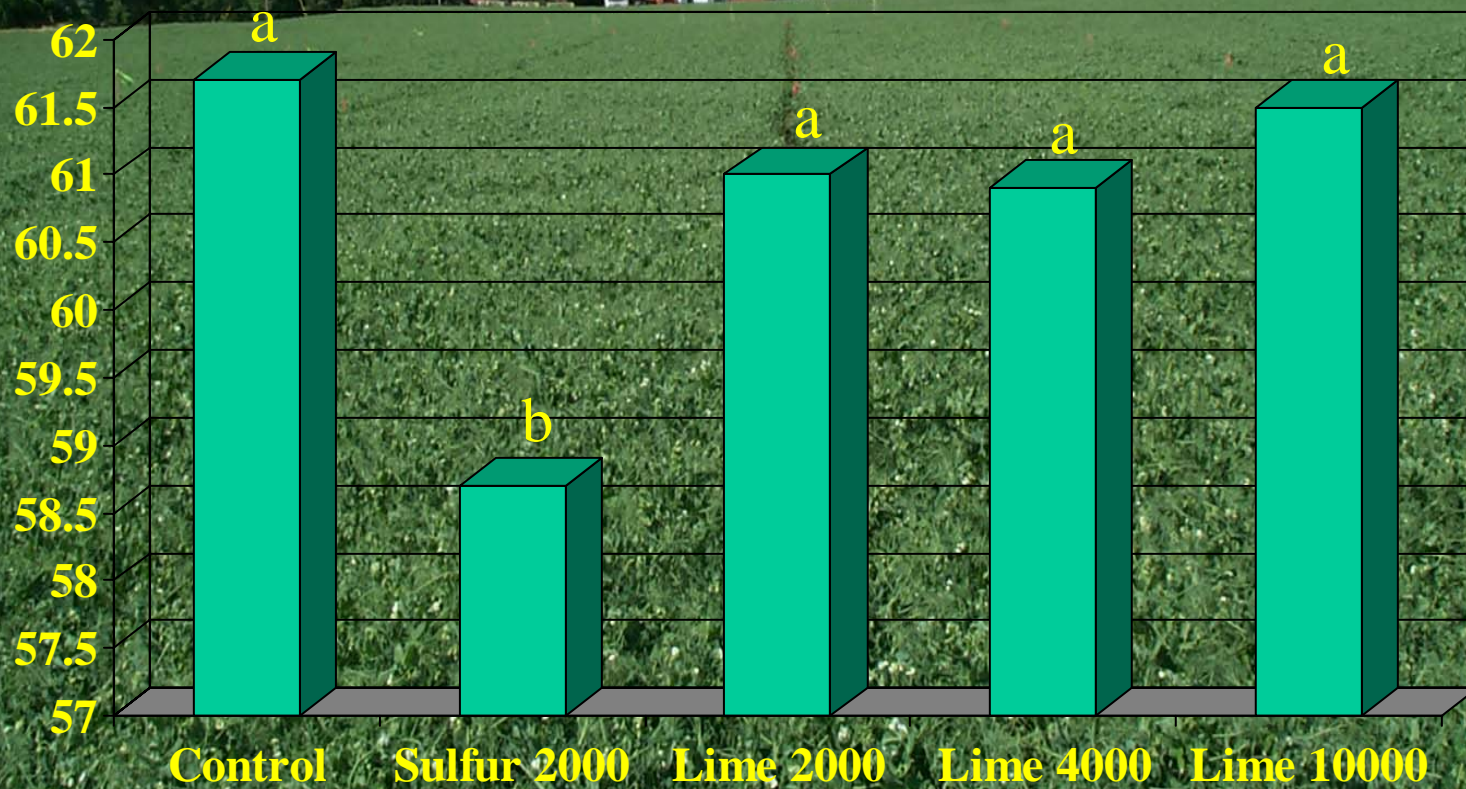
Measurements Assessed

- Stand counts, two weeks after planting
- Plant height at bloom
- Plant fresh weight at bloom
- Root disease at bloom
- Top fresh weight at bloom
- Top dry weight at bloom
- Dry root weight at bloom
- Yield (Dry wt.)

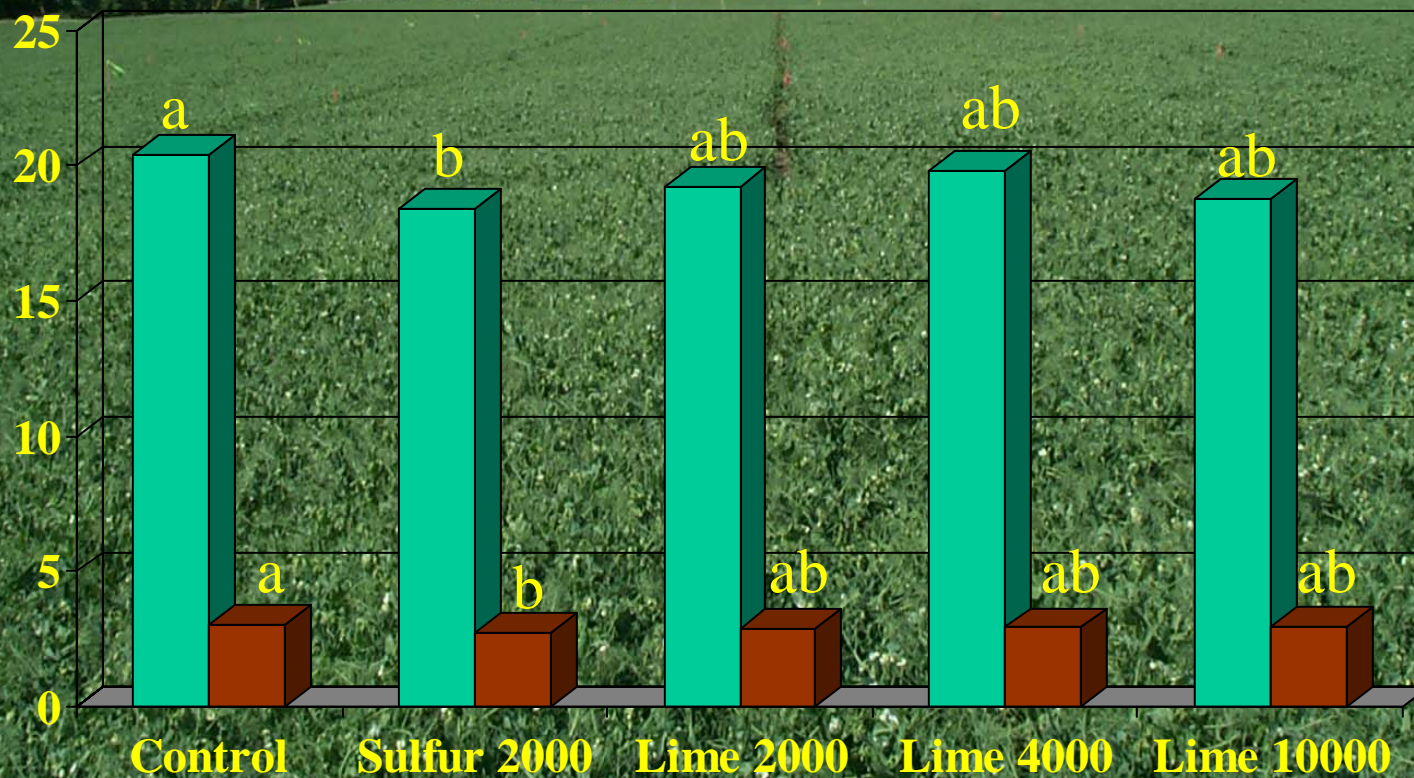
Effects of Liming on Stand Counts (10 feet/row)



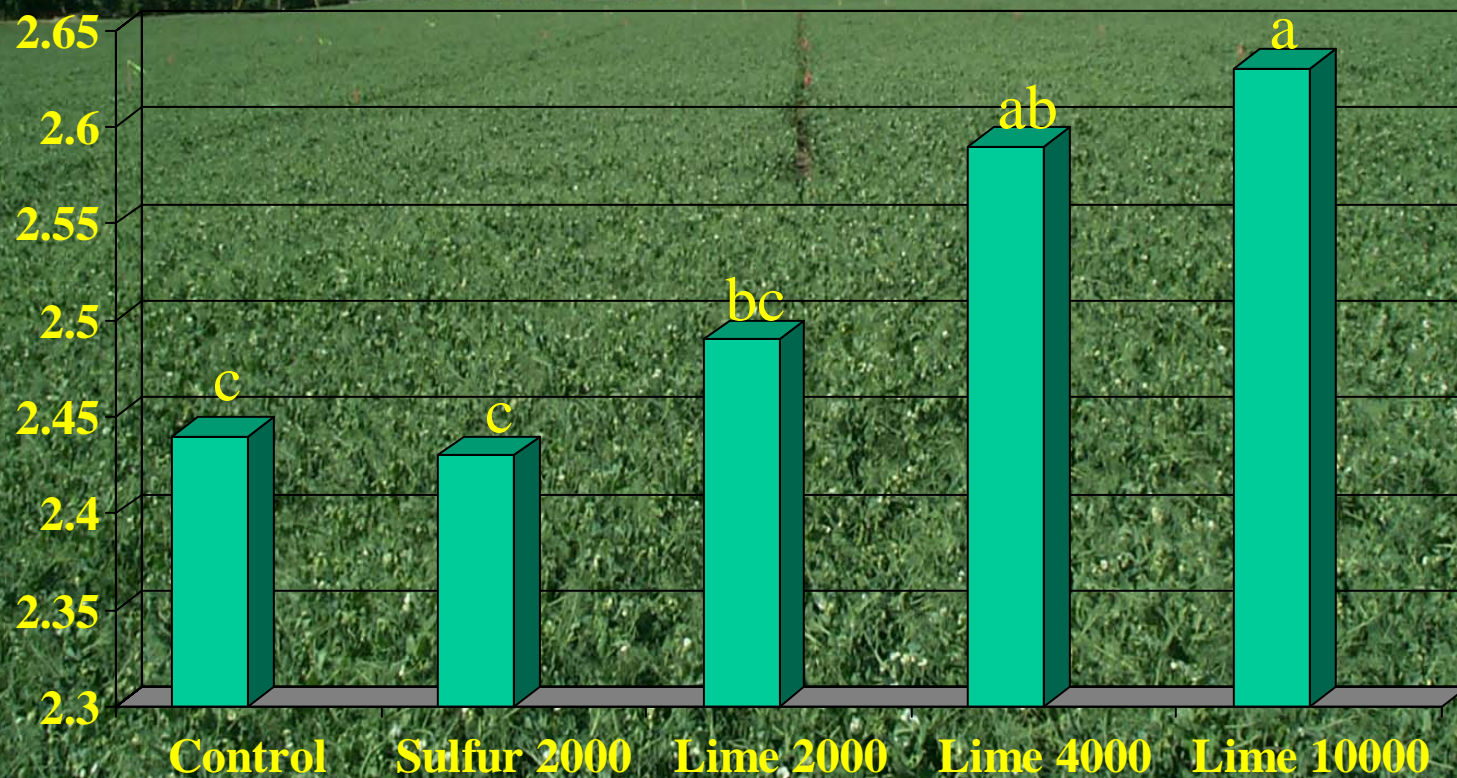
Effects of Liming on Plant Height (cm)



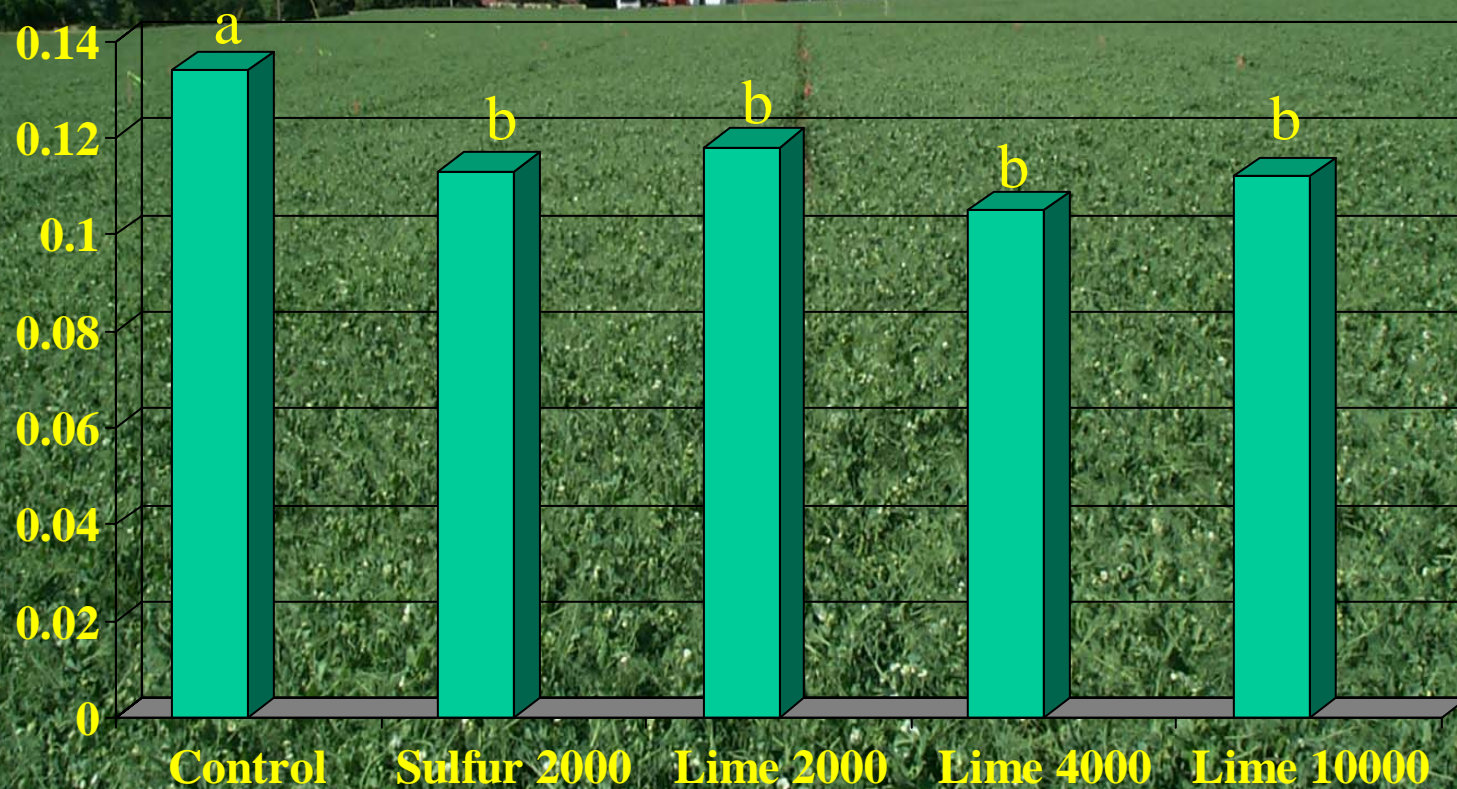
Effects of Liming on Foliar Fresh and Dry Weight (grams)



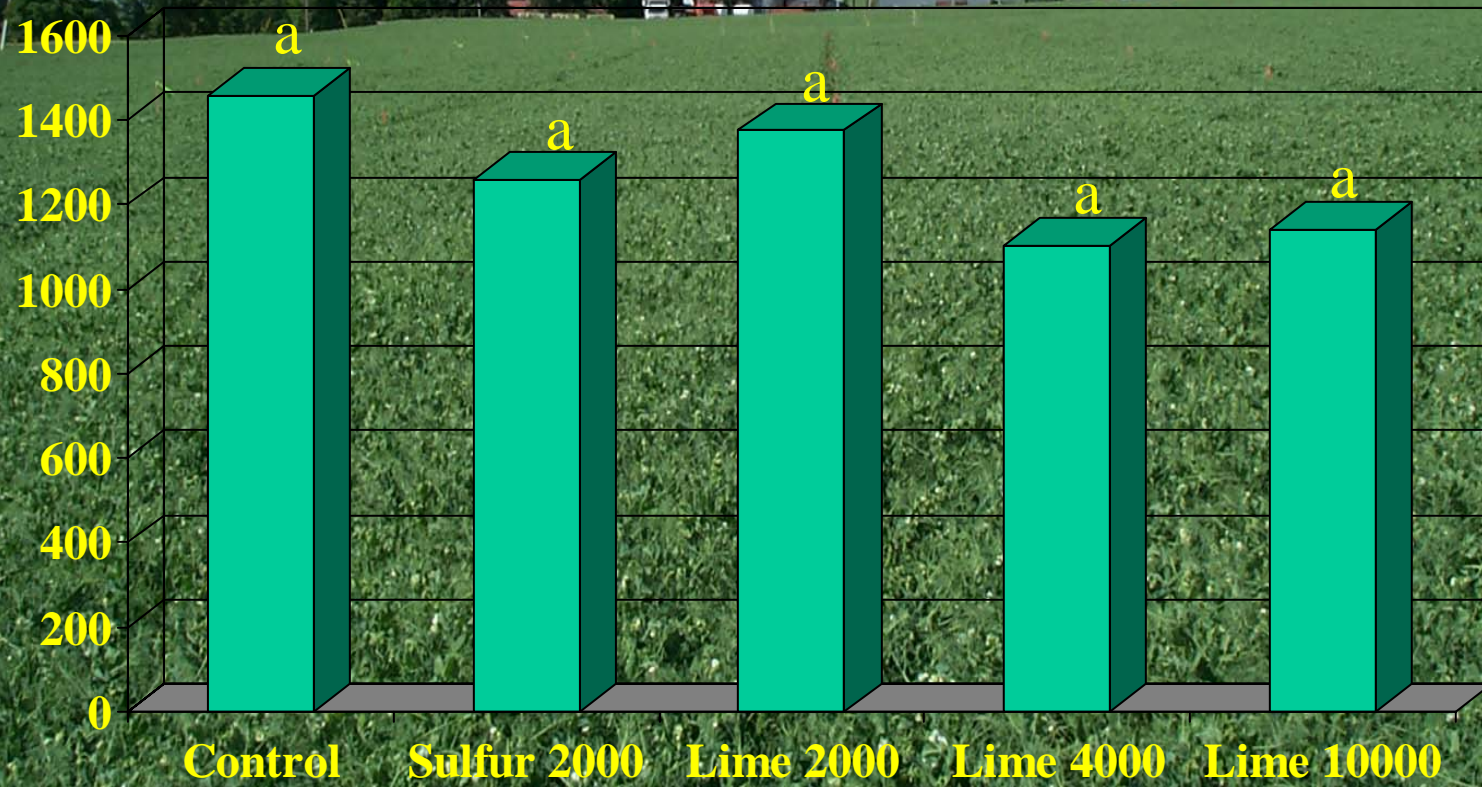
Effects of Liming on Root Disease (grams)



Effects of Liming on Dry Root Weight (grams)



Effects of Liming on Dry Yield (lb/acre)



Conclusions

Lime Applications

- Stand counts not significantly different.
- Plant height, plant weight, and yield were all greatest for the non-treated control.
- Root disease significantly increased by lime but not sulfur.
- Future research:
 - Assess nutrient levels in plants to see what is happening
 - Assess long term impacts of liming

Acknowledgements

- Eric
- Ginny Coffman
- Smith's Frozen Foods
- Ed Leahy
- Dennis Ray





Questions?

Soil Fertility 1 Foot Depth

NO ₃ (lbs per acre)	34.5
NH ₄ (lbs per acre)	14.25
Sulfur (ppm)	3
pH	5.53
Soluble salts	0.40
Organic matter %	2.13
P (bic) (ppm)	21.5
K (bic) (ppm)	443.25
P (ace) (ppm)	4.1
K (ace) (ppm)	359.75
Calcium (meq. per 100 grams)	7.93
Magnesium (meq. per 100 grams)	2.60
Sodium (meq. per 100 grams)	0.07
Boron (ppm)	0.18
Zinc (ppm)	1.73
Manganese (ppm)	26.9
Iron (ppm)	49.5
Copper (ppm)	1.53