THE INFLUENCE OF POLYACRYLAMIDE (PAM) ON NUTRIENTS IN FURROW IRRIGATED PASTURES

Ross A. Spackman
UI Ph.D. Candidate (Soils)
CSI Associate Professor (Agriculture)

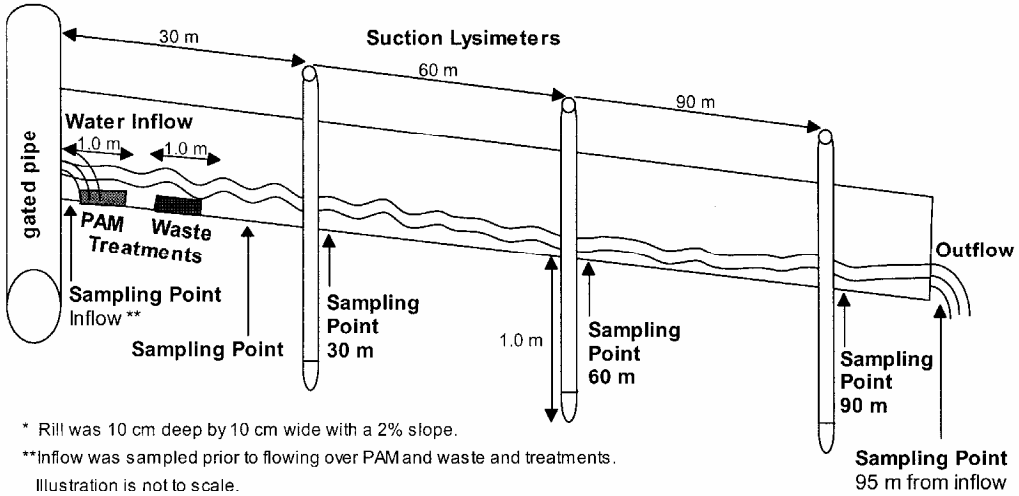
This is your irrigated furrow.
This is your furrow on PAM!
USDA
Northwest Irrigation and Soils Research Laboratory, Kimberly, Idaho

Materials and Methods

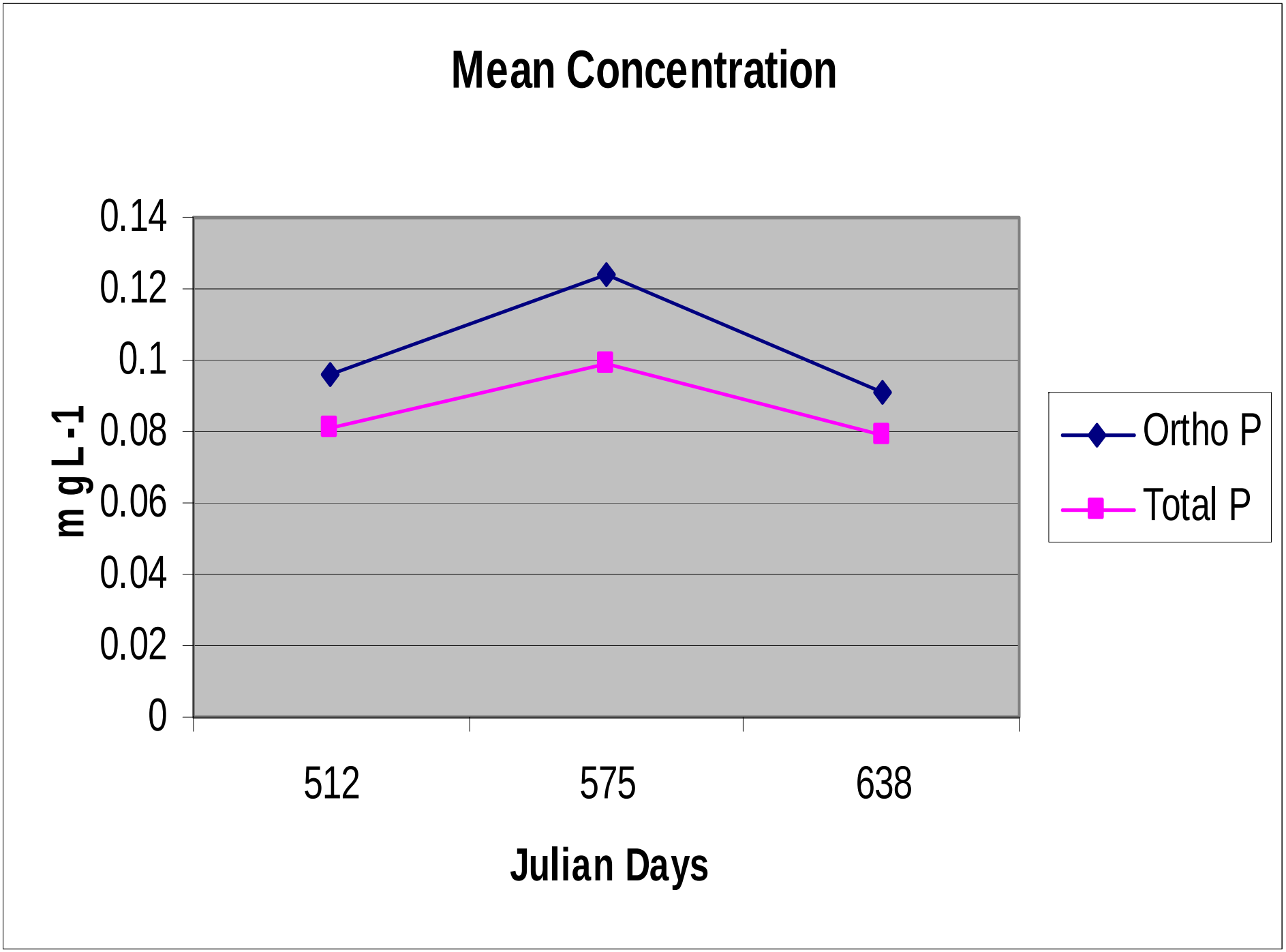
Methods

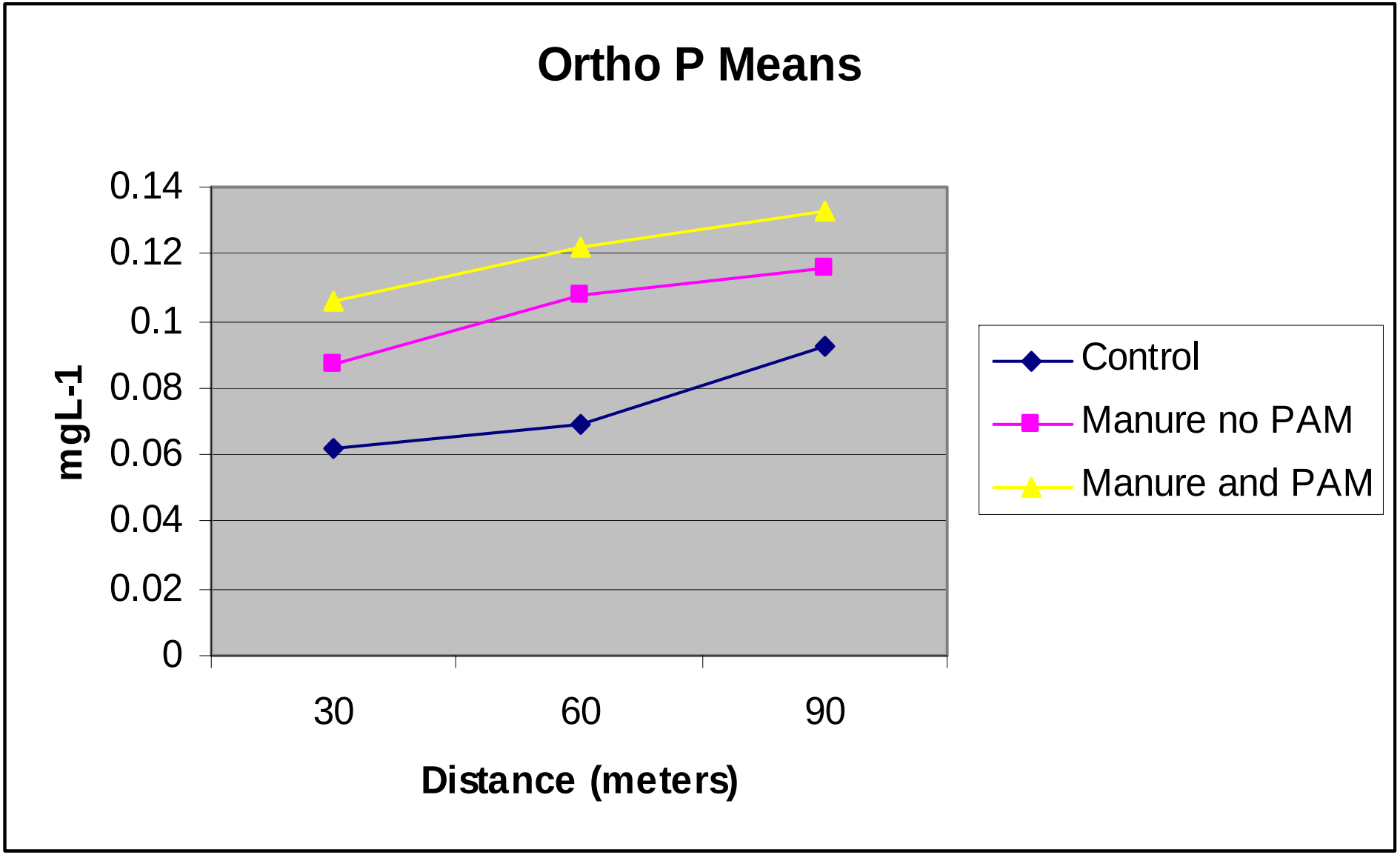
- 4 treatments, 4 replications, 3 collection events during season
- Surface water and soil 30, 60, 90 meters
- Surface water at 2, 4, 8 hrs during irrig.
- Soil 3 depths (0-5, 5-15, 15-30 cm) post-irrigation
- Soil water at 30, 60, 90 meters post-irrigation

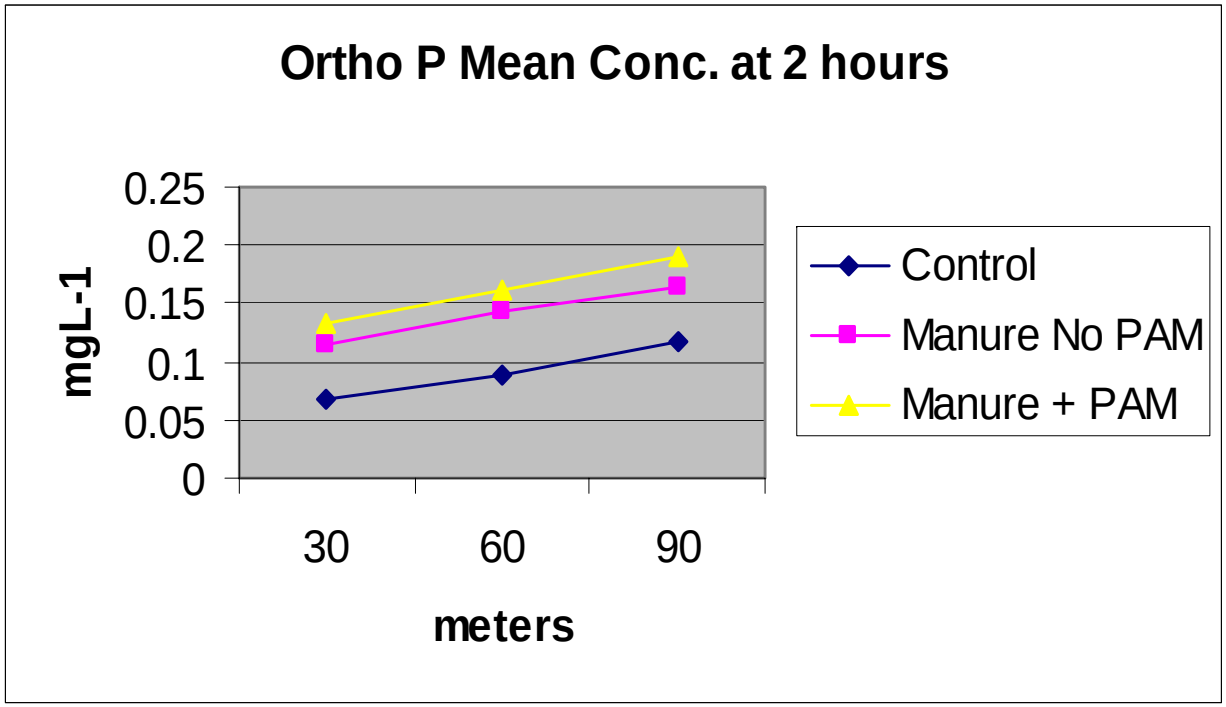
Layout and Treatments

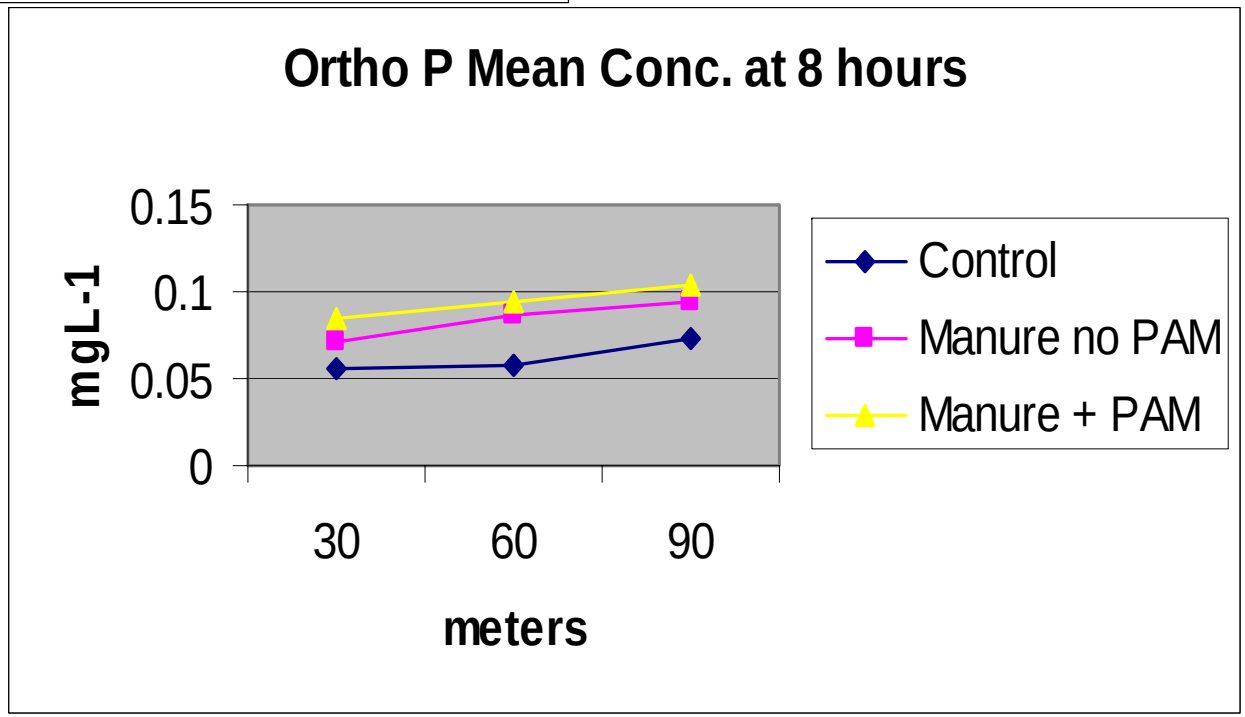


1) dairy waste without PAM
2) dairy waste with PAM dissolved in irrigation water
3) dairy waste with PAM applied to soil in a patch
4) control (no dairy waste or PAM applied).


Mean Concentration
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
m g L -1
512
575
638
Julian Days
Ortho P
Total P


Ortho P Means
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
mgL-1
30
60
90
Distance (meters)
Control
Manure no PAM
Manure and PAM

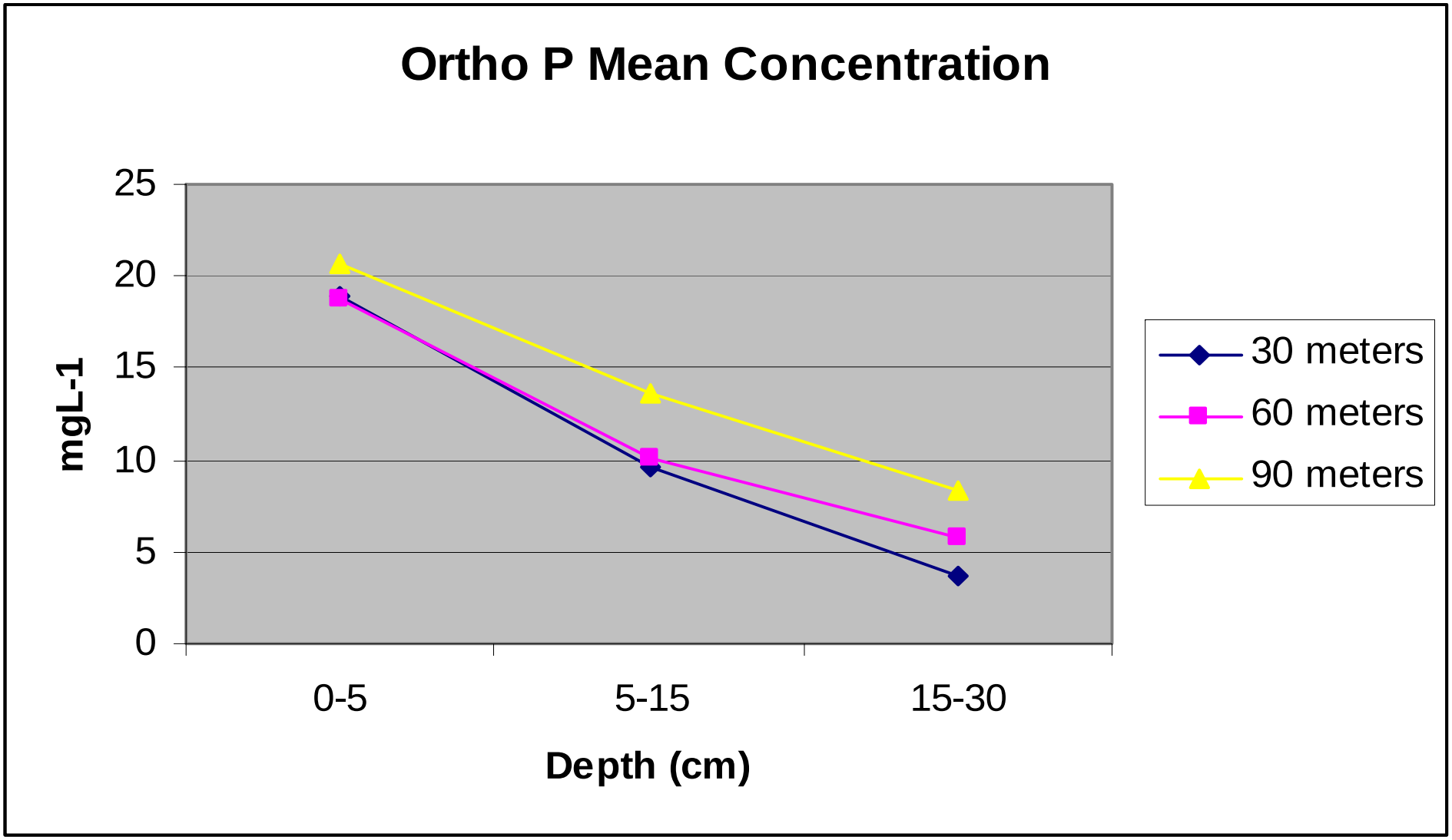

Ortho P Mean Conc. at 2 hours
0.25
0.2
0.15
0.1
0.05
0
mgL-1
30
60
90
meters
Control
Manure No PAM
Manure + PAM


Ortho P Mean Conc. at 8 hours
0.15
0.1
0.05
0
mgL-1
30
60
90
meters
Control
Manure no PAM
Manure + PAM

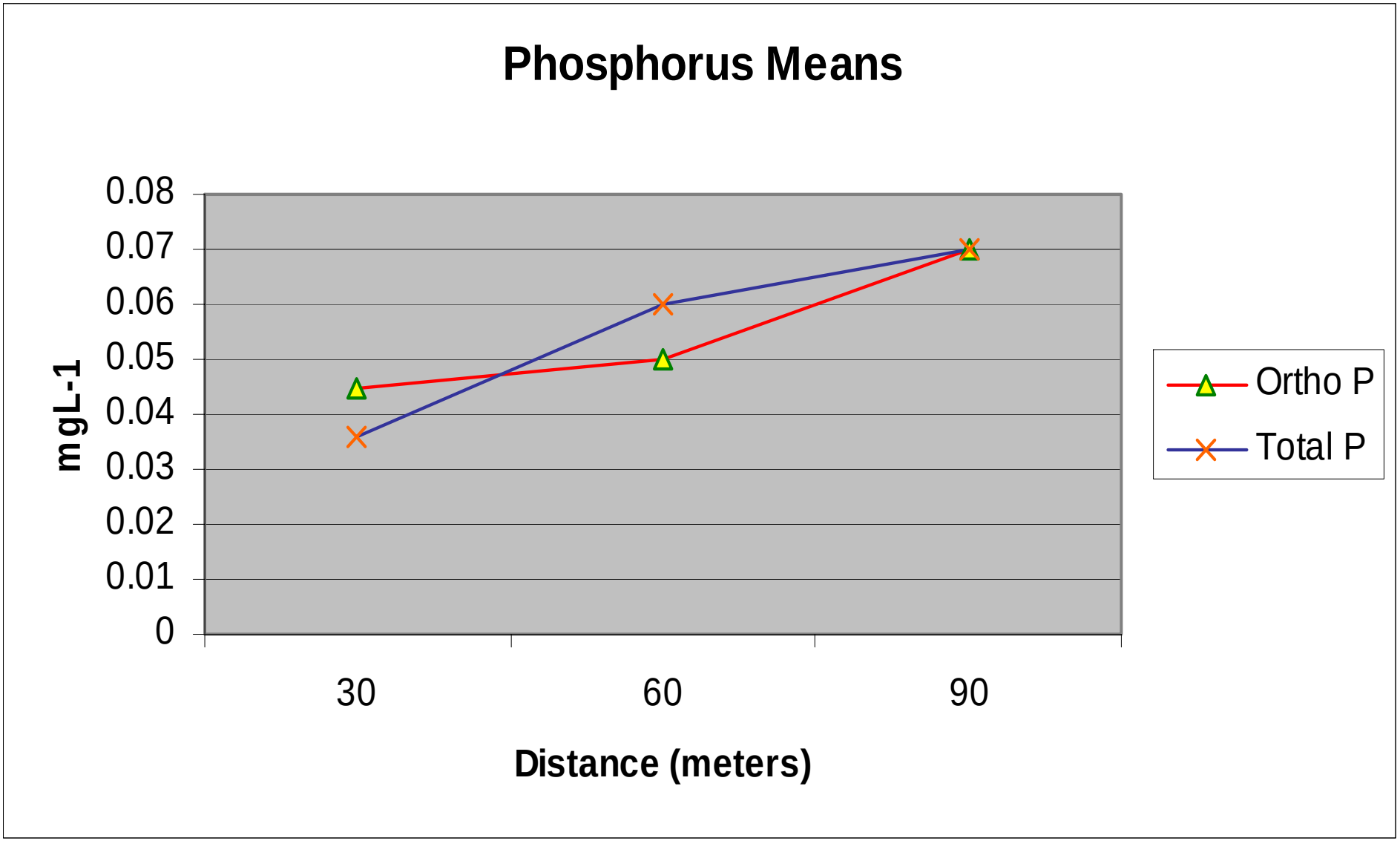
Jug Studies

Treatment	Ortho P Mean	Total P Mean
Soil	0.255 a	0.300 a
Soil + Grass	7.90 b	8.09 b
PAM + Grass	8.58 b	8.79 b
Soil + Grass + PAM	9.35 b	9.68 b
Soil + PAM	0.217 c	0.28 a

Soil


Ortho P Mean Concentration
25
20
15
10
5
0
mgL-1
0-5
5-15
15-30
Depth (cm)
30 meters
60 meters
90 meters

Soil Water


Phosphorus Means
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
mgL-1
30
60
90
Distance (meters)
Ortho P
Total P

Suspended Sediment and Infiltration

Significance of this research

Results

- Soluble ortho P concentration increased down furrow likely due to leaching from grass.
- Soil phosphorus was mostly held at surface not posing ground water threat.
- Soil water phosphorus was negligible, increasing down gradient.
- Suspended sediment was not affected by PAM due to well-sodded furrows.
- **Infiltration decreased on PAM treatments.**

Discussion

- What about grass filter strips?
- Source of leachable P?

- PAM application in absence of flocculable soil may coat macropores and reduce infiltration at PAM concentrations lower than expected. <u>All work done previously on highly disturbed soil.</u>

Thank You