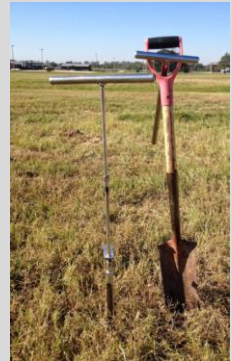


## Recent and Current Projects

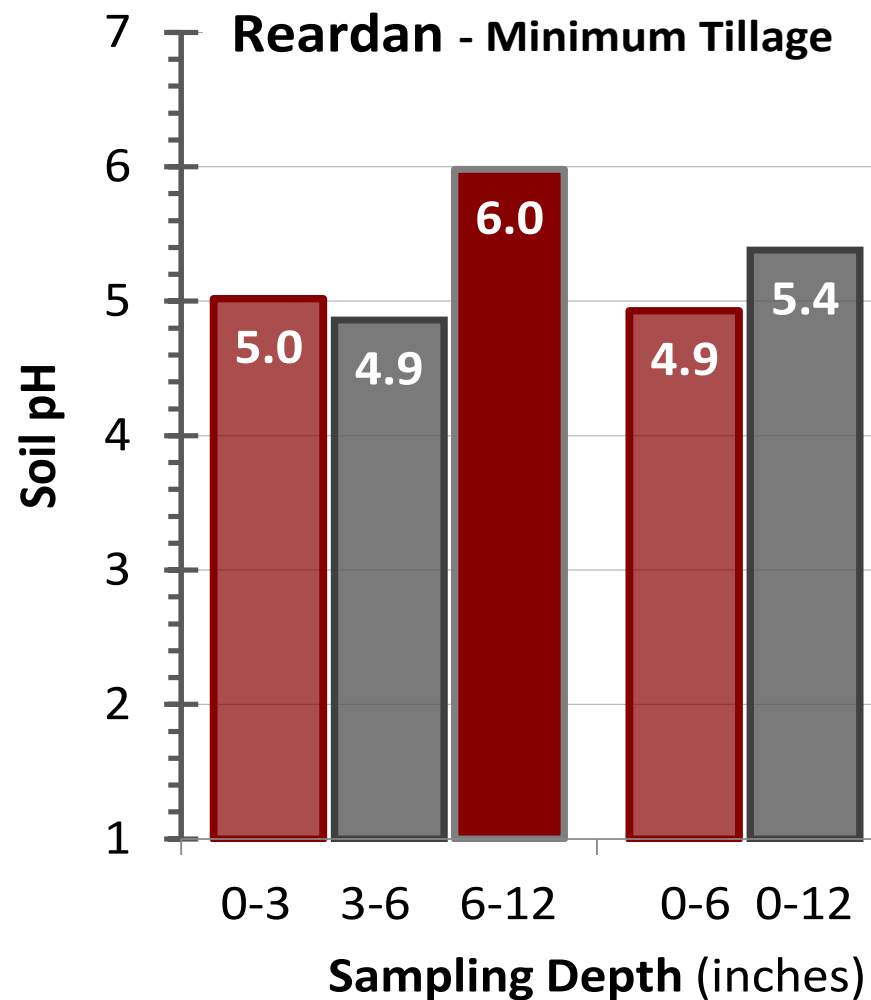
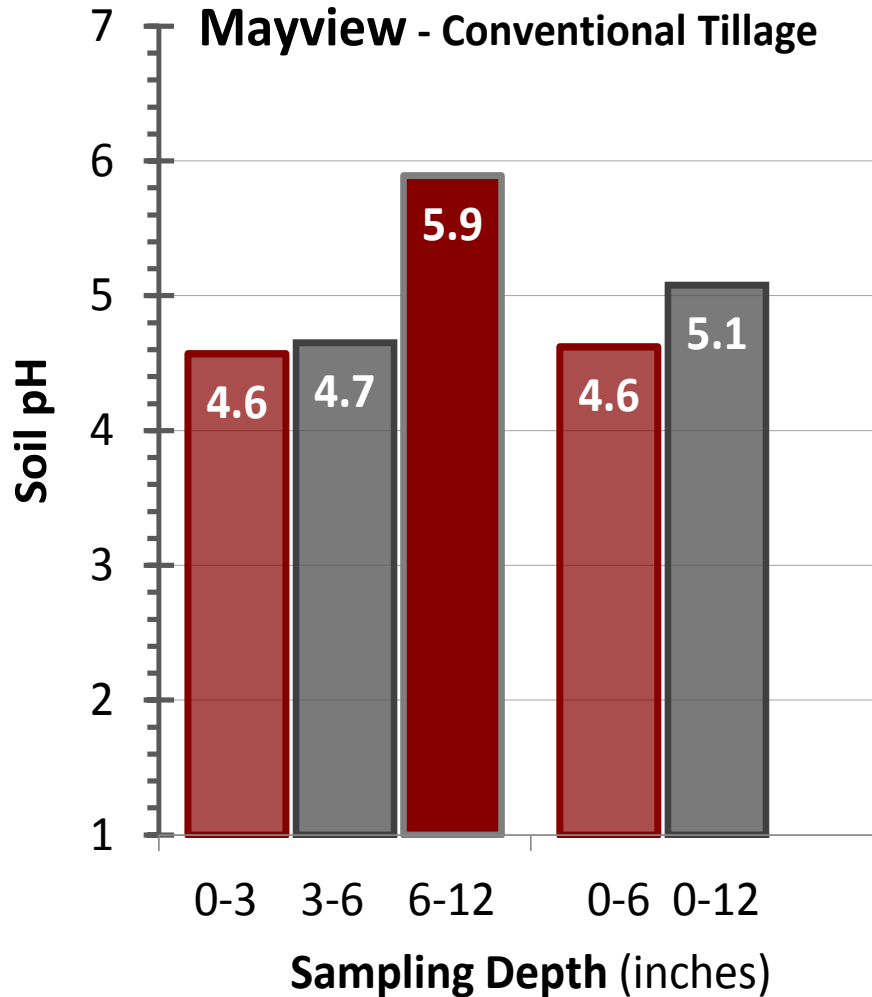
1. Soil Sampling Survey in Columbia County and the Region
2. Small plot lime and nutrient study
3. WSU and OSU research plots with lime and nutrient applications.



# Soil Sampling Survey

- 76 fields in Columbia County sampled (2013 and 2014)
  - 90% of fields reported soil pH below 5.2 in top 6 inches
  - No difference in soil pH due to rainfall, tillage, or location
  - Native soils pH range 6.2 to 6.8
- 6 Variety Testing Program plots soil sampled for soil pH
- Various and random other locations around eastern Washington sampled

# Soil pH Sampling Variety Test Locations (May 2015)



# Small Plot Lime and Nutrient Applications

- Liquid Lime was applied at the rate of about 170 gal (2000#/acre)
- Date Applied: April and September 2014



Blue – untreated lime  
 White - treated lime

## Plot Map

no added nutrients	Border	1B-	2W-	3W-	4B-	5W-	6B-	7B-	8W-	Border	Border	9W-	10B-	11W-	12B-	13W-	14B-	15W-	16B-	Border
Cu, Zn, and B nutrients added	Border	1B+	2W+	3W+	4B+	5W+	6B+	7B+	8W+	Border	Border	9W+	10B+	11W+	12B+	13W+	14B+	15W+	16B+	Border
		1 no lime	2 lime	3 lime	4 no lime	5 lime	6 no lime	7 no lime	8 lime			9 lime	10 no lime	11 lime	12 no lime	13 lime	14 no lime	15 lime	16 no lime	

lime strips 10 feet x 100 feet

## Micro-Nutrients Applied

- Nutrients were evaluated with the soil test report to determine the nutrients needed
- Date Applied: September 15, 2015
- Nutrients Applied:
 

• Zinc	1.13 #/acre	\$18.00
• Copper	0.788 #/acre	\$19.80
• Boron	1.1 #/acre	\$11.00
• Potassium	21.5 #/acre	\$8.50
• Chloride	16 #/acre	\$0 with the KCL

# Soil pH Change Results

2015 – 6 months after lime application (October 2014 to March 2015)

2017 – 31 months after treatment

## Walla Walla Plot

<u>pH results</u>	<u>2015</u>	<u>2017</u>
Treated 0-3"	Range 5.3 to 6.2	5.6 to 6.9
Untreated 0-3"	Range 4.7 to 5.2	4.4 to 5.2



2015 – 11 months after lime application (April 2014 to March 2015)

2017 – 36 months after treatment

## Columbia Plot

<u>pH results</u>	<u>2015</u>	<u>2017</u>
Treated 0-3"	Range 6.0 to 6.7	6.0 to 6.9
Untreated 0-3"	Range 4.8 to 5.3	5.2 to 5.5

## Spring Wheat 2016 – Columbia Plot 1

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16.8%	yield increase - nutrient only treatments
4.4%	yield increase - lime only treatment
17.6%	yield increase - lime plus nutrient treatments

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## Winter Wheat 2016 – Columbia Plot 2

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5.4%	yield increase - nutrient only treatments
0.1%	yield increase - lime only treatment
6.6%	yield increase - lime plus nutrient treatments

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## Winter Wheat 2017 – Walla Walla Plot

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3.7%	yield increase - nutrient only treatments
2.5%	yield increase - lime only treatment
6.7%	yield increase - lime plus nutrient treatments

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# WSU, OSU, and UI Lime/Nutrient Project

- Funded by both **Washington Grain Commission** and **Oregon Wheat Commission**
- Locations include Pullman, Pendleton, and Moro  
3 rainfall locations
- Lime applied fall 2016
- Nutrients applied spring 2017



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Professor, Extension Soil Scientist, OSU

## Pendleton and Moro, OR

Each will have 2 sets of plots due to being a wheat – fallow cropping system, thus ensuring a harvested crop each year.

## Whitman County/Pullman, WA

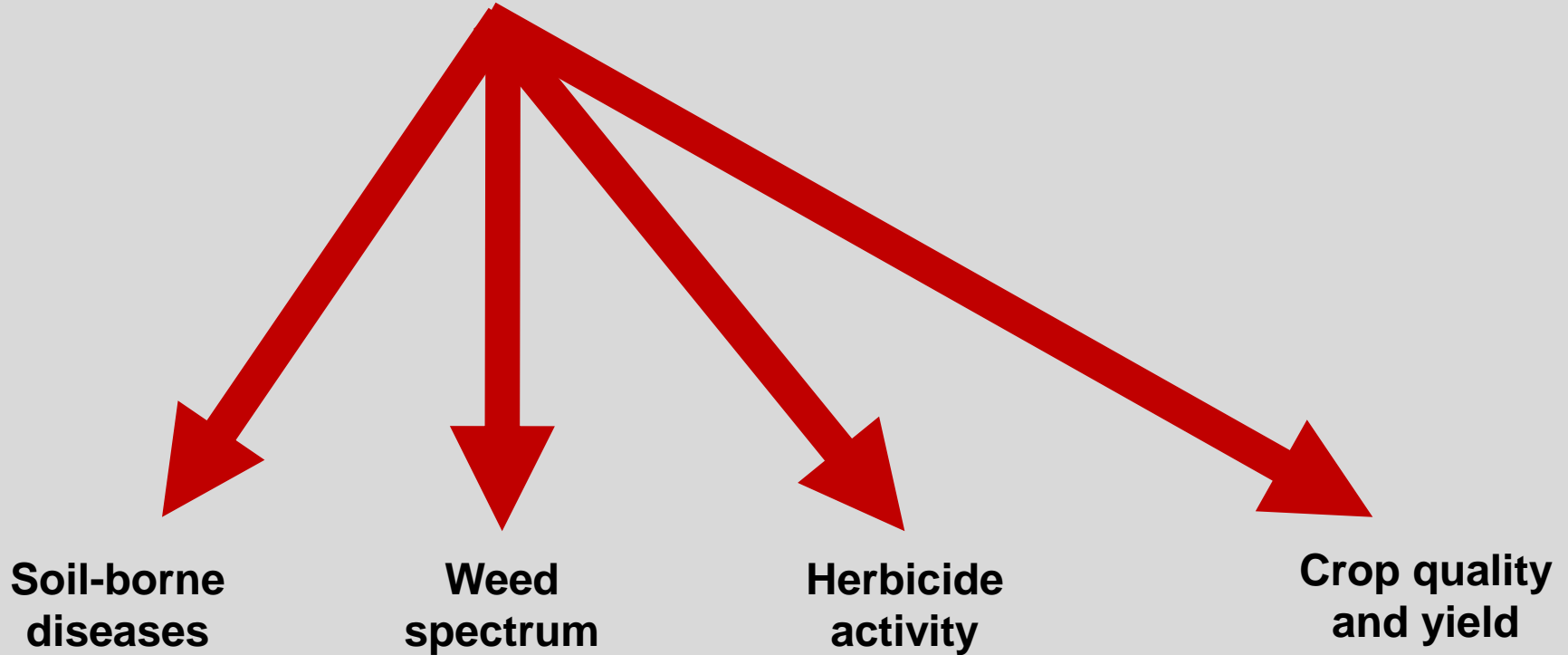
Two locations (Palouse Conservation Field Station and Clark Farms) each have one plot due to being an annual cropping system.

		24 ft		192 ft total								
200 ft total	soft	600	1200	0	1200	2400	600	2400	0	block 4		
		2400	600	2400	0	1200	600	0	1200	block 3		
		600	1200	0	600	2400	0	1200	2400	block 2		
		2400	2400	1200	1200	600	600	0	0	block 1		



## Specifically:

Try to quantify some impacts of low soil pH



# Lime impact on root and plant development



**Root Dominant Plants**

**Soil acidification**, or a decrease in soil pH, is a natural process that is accelerated by crop production practices, primarily the use of nitrogen fertilizers. Anderson et al. 2013

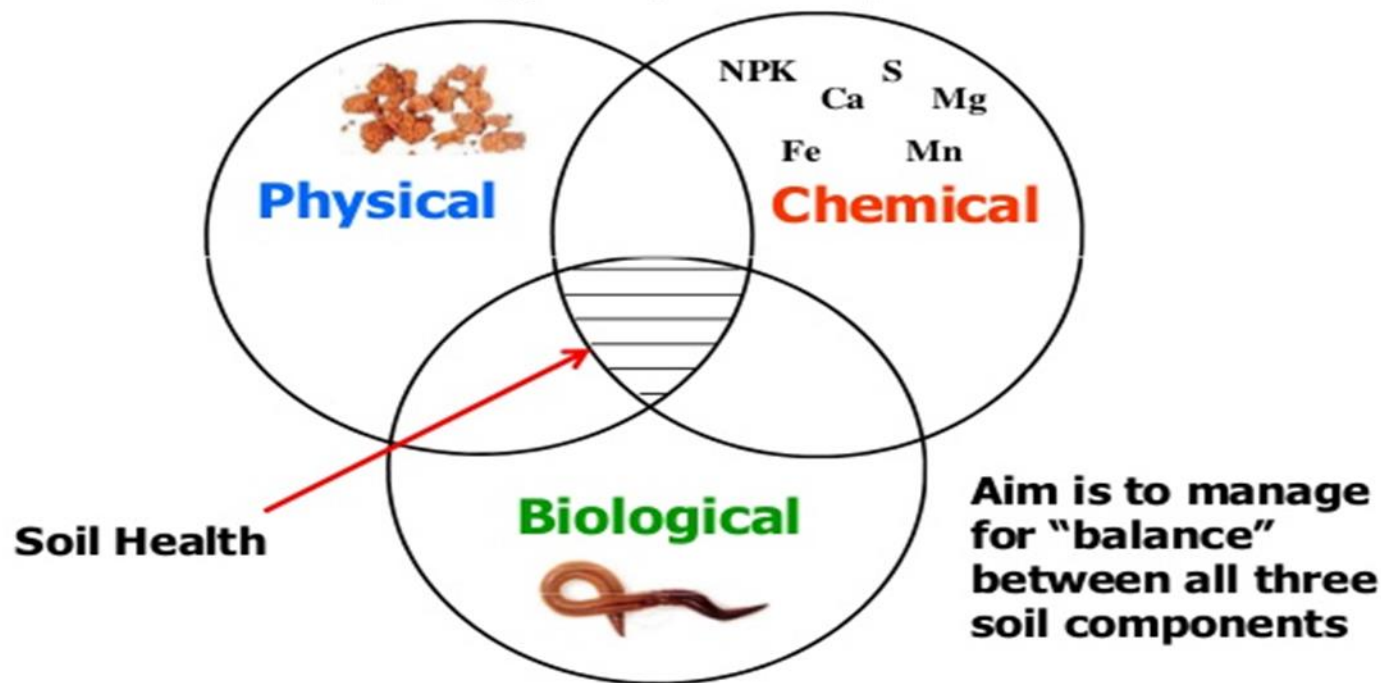
\* **At least 80%** of the soil in northern Idaho and eastern Washington will someday **require lime** to produce maximum **potential crop yields**. Robert Mahler 1986

\* **Reduced Nutrient** availability reduces crop yield/quality and increases cropping system problems like soil compaction, water infiltration, and harvest problems.

It is clear that **any imbalance in the microbes in soils** can lead to reduced soil microbial health which impacts cropping system productivity.

Dr. Tarah S. Sullivan, WSU Crop & Soil

**Soil quality is the capacity of a soil to function (in a farm or ecosystem) and thereby sustain productivity, maintain environmental quality, and promote plant and animal health**



# Questions

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