

## Growing Quality Produce on Difficult Soil

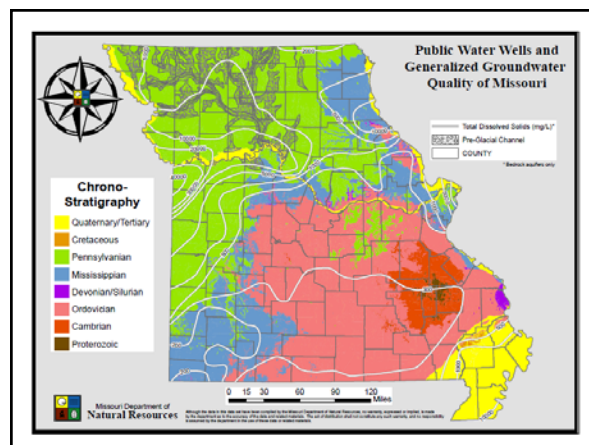
Kenny Duzan, Grower  
Columbia, Missouri

## About Me and My Operation

- Produce Farming for a Total of 16 Years
- Part Time Farmer
- Also Work in the Drinking Water Branch of DNR
- Partner in a Brew-Pub in Columbia
- But, Farming is, and Has Been, My Passion since I was a Kid
- My Wife Becky Helps and Keeps me in Line

## About Me and My Operation

- Live on 10 Acres
- Farm Approximately 3.5 Acres
- Irrigate from a 1.5 Acre Pond
- Use Trickle Irrigation and Overhead Sprinklers
- Sell at the Columbia Farmers Market
- Also Supply Fresh Produce to Broadway Brewery
- Not "Organic" Grower

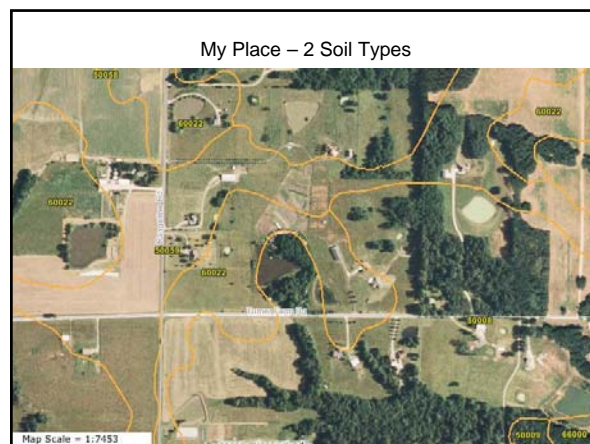
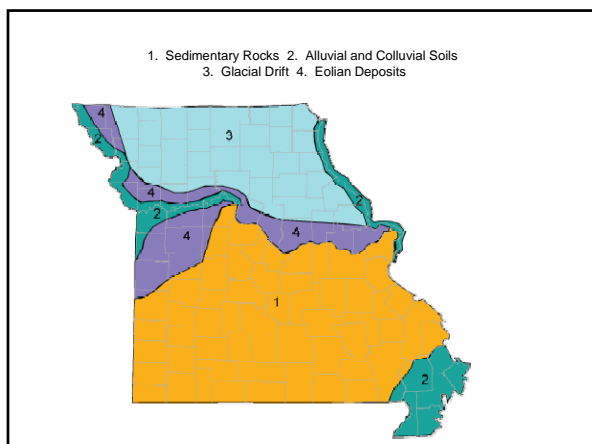


## Glaciers in Missouri

- May have been many glacial events throughout geological history
- Most important glacial events began about 250,000 years ago
- Last event (advance) was 12,500 years ago
- Glaciers made Missouri a great farming state

## Soil Origins

- **Parent Materials of Missouri**
- Parent material is the unconsolidated weathered mineral or organic matter from which soil is developed (SSSA, 1997). In other words, it is the initial starting material that is modified through physical, chemical, and biological processes to form soil. Due to the wide variety of parent materials, a classification system has been developed to categorize these materials.
- Sedimentary Rocks
- Alluvial and Colluvial Deposits
- Glacial Drift
- Eolian Deposits



### Mexico Series Soil Profile

- very deep,
- poorly drained
- formed in loess over loamy sediments derived from till.
- soils are on ridge and hillsides of the Central Claypan Till Plains and have slopes of 0 to 4 percent.
- mean annual temperature is about 12 degrees C (53 degrees F),
- mean annual precipitation is 991 millimeters (39 inches).

### Leonard Silt Loam

- very deep,
- poorly drained
- slowly permeable soils
- formed in loess
- paleosol from glacial till
- commonly are on side slopes and heads of drainageways
- Slopes of 2 to 14 percent.
- mean annual temperature is 53 degrees F.
- mean annual precipitation is 36 inches.

Soil test results from 3 fields sampled in Nov. 2010- Major Nutrients (lbs/acre), pH and % organic matter

Parameter	Field ID		
	5 West Spinach	4 West Tomatoes	1 West
pH*	6.8 (H)	6.9 (H)	4.6 (L)
OM	2.3	6.0	3.1
P	122 (H)	155 (H)	53 (M)
K	248 (H)	379 (VH)	55 (VL)
Ca	2986 (H)	3116 (H)	2101 (L)
Mg	276 (H)	317 (H)	265 (H)

H= high rating      L= low rating  
VH= very high      VL= very low  
M= medium



Example- comparison,  
**tomatoes**

	Field ID		
Nutrient-recommended	5 West	4 West	1 West*
Lime	0	0	1380
N	100	100	100
P	110	70	195
K	150	35	320

\* Lime is supplying required calcium

I Grow My own Onions from Seed



Example- comparison,  
**onions**

	Field ID		
Nutrient-recommended	5 West	4 West	1 West*
Lime	0	0	1380
N	100	100	100
P	110	70	195
K	100	0	270

\* Lime is supplying required calcium



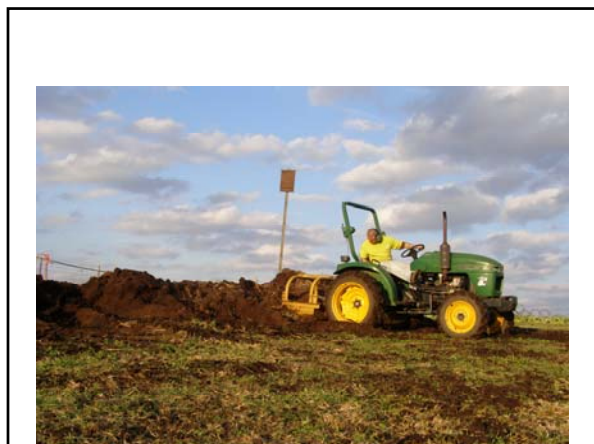
Example- comparison,  
**spinach**

	Field ID		
Nutrient-recommended	5 West	4 West	1 West*
Lime	0	0	1380
N	70	70	70
P	35	0	120
K	100	70	270

\* Lime is supplying required calcium

How I Fertilize  
Pre-plant and Occasional Side-dress





**Compost Analysis Report**

To: Kenay Dumas  
9255 E. Turner Farms Road  
Phone: 575-355-4843  
Email: ken.dumas@ces.ncsu.edu

Date received: 12/03/10  
Date completed: 12/17/10  
Lab No: C10083  
Sample ID: 1  
File Name: KenD1.doc

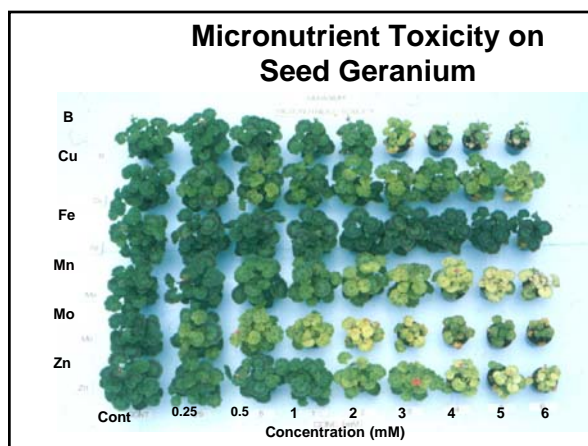
Tests	Units	Test Results	Desired Range	Interpretation	
				Low	High
pH		6.67	6.0 - 8.0		x
E.C. - saturation Ppm	mmho/cm	1.468	< 4	x	
- 1:1	mmho/cm		< 2.5		
- 1:2	mmho/cm		< 1.5		
Total Nitrogen (N)	%	2.280			
Total Phosphorus (P)	%	0.428			
Total Potassium (K)	%	0.643			
Total Calcium (Ca)	%	1.922			
Total Magnesium (Mg)	%	0.348			
Total Zinc (Zn)	ppm	75	< 2800		x
Total Iron (Fe)	ppm	654			
Total Manganese (Mn)	ppm	179			
Total Copper (Cu)	ppm	24	< 1500		x
Total Carbon (C)	%	49.54			
C/N Ratio		21.73	< 25		x
Nitrate-N	ppm		40 - 90 *		
Ammonium-N	ppm				
Moisture	%	82.37	< 50		x

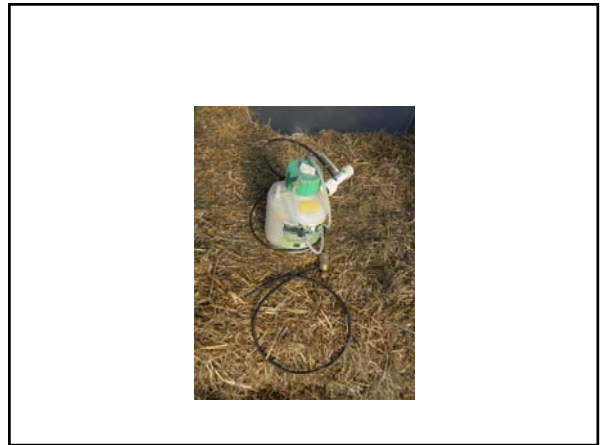
- Based on test
- Total N 2.28%      684 lbs/ac (105 available\*)
- P2O5                    0.428            128 lbs/ac
- K2O                     0.643            193 lbs/ac
- Calcium 1.922        577 lbs/ac
- \* About 15% of the Total N in compost is available
- the following growing season

**Case study- 3 field comparison, for tomatoes following compost addition**

Nutrient-recommended	5 West		4 West		1 West	
	Before	After	Before	After	Before	After
<b>N</b>	<b>100</b>	<b>5</b>	<b>100</b>	<b>15</b>	<b>100</b>	<b>5</b>
<b>P</b>	<b>110</b>	<b>0</b>	<b>70</b>	<b>0</b>	<b>195</b>	<b>67</b>
<b>K</b>	<b>150</b>	<b>0</b>	<b>35</b>	<b>0</b>	<b>320</b>	<b>127</b>
<b>Ca*</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>670</b>	<b>100</b>

\* Lime is about 75 % calcium (1,000 pounds of Ca in the recommendation) & Gypsum is about 20% lime (3330 lbs would be recommended if the pH was above 6.0, or 670 pounds)





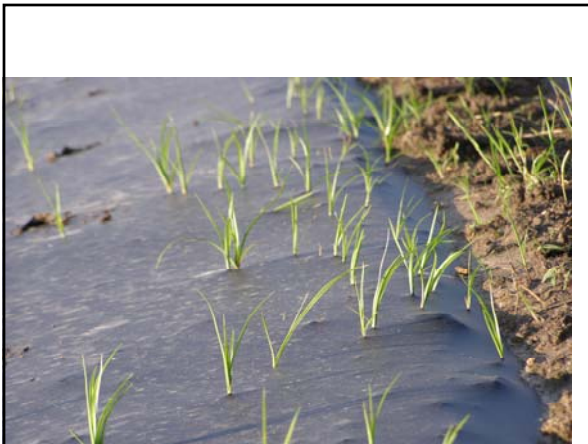
Home-Made Spray Shield



The Completed Rig

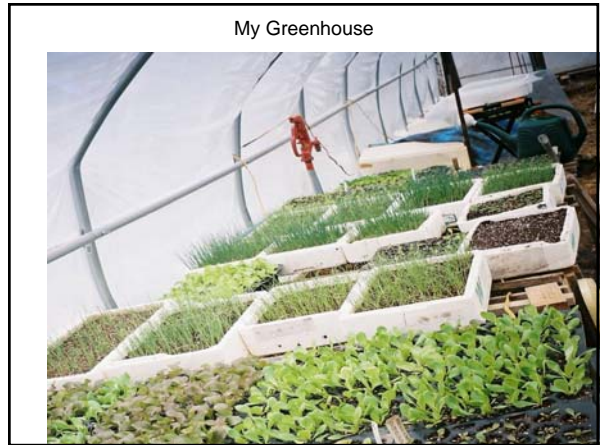


Why I Spray



Organic Pest Protection





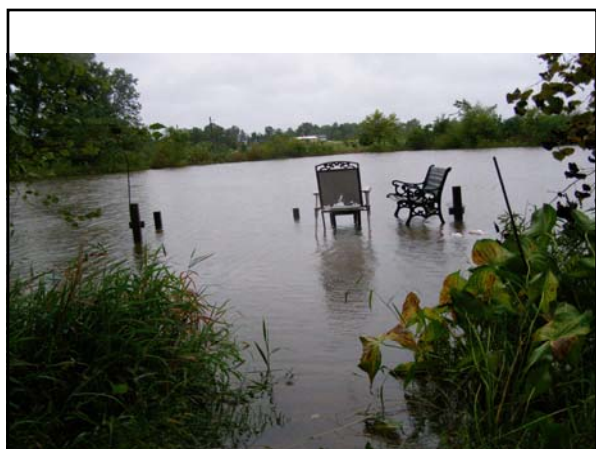


**Difficult situations Mother Nature throws at you**

Nitrogen & saturated soils

- Nitrification is aerobic, ammonium → nitrate-N stops
- Leaching of nitrate-N occurs on coarse textured (sandy) soils
- Denitrification nitrate-N to gaseous N occurs on medium to fine textured soils, needs:
  - Lack of oxygen
  - Nitrate-N
  - Warm soil temperatures with organic matter or organic residue

**How do you decide if more N is needed? How do you apply it? Without watering more? Especially if the beds are mulched with plastic? Warm, sunny weather with no rain is what is needed!**



**Some of You Have Been Here**







Kids Excited about the Market



The Tomato Cages are Waiting For Spring



The End



Questions?