Soil Water in Oklahoma No-Till

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No-till Adoption

- Oklahoma has lagged behind
- 2008 OK Survey
  - 30%

![Graph showing No-Till Acreage (% of crop acreage) from 1988 to 2004 for Oklahoma and the U.S.](chart.png)

- Oklahoma
- U.S.
No-till Adoption

- No-till is Increasing Because:
  - Elevated Fuel Prices
  - Improved No-till Technology
  - Cost-share Programs
  - Reduced Labor Costs
  - Improved Soil Quality
What is No-Till

Lack of Full Width Inversion Tillage
Impact of No-Till on Soil Condition

- Crop Residue is Maintained on Surface
- Soil Organic Matter Increases.
- Soil Structure is Improved

Each are interrelated and Influence Soil Water Flow.
Crop Residue

- Residue Protects the Soil Surface from Crusting
- Increased Biological Activity at soil surface.
Soil Organic Matter

- Increased Biological Activity
- Increases Aggregate Stability
- Increases Soil Water Holding Capacity

McVay, 2006
Soil Structure

- Increased Macroporosity
- Reduced compaction
- Increased Water Infiltration

Luo et al. (2007)
Current Research Efforts

- Determine if no-till management influences soil water flow dynamics in North Central OK
- Experiment Located near Lahoma
- Pond Creek Silt loam
- 5 rotational treatments
- Measure soil moisture
Crop Rotation Treatments

- Conventional Tillage Wheat
- No-till Wheat
- No-till Wheat, DC Sorghum, Soybean
- No-till Wheat, DC Soybean, Corn
- No-till Wheat, DC Sunflower, Sorghum
Soil Moisture Measurements

- Neutron Probe
- Access tubes place to a depth of 190 cm
- Measurements Collected Weekly
July 31, 2009

Neutron Probe Reading

Soil Depth (cm)

July Rainfall = 7.5 cm
Aug. 29, 2009,

Soil Depth (cm)

Neutron Probe Reading

Aug. Rainfall = 20 cm

- CW
- NTW
- Sorghum
Sept. 27, 2009

Soil Depth (cm)

Neutron Probe Reading

- CW
- NTW
- Sorghum

Sept. Rainfall = 1.3 cm
Summary

- The Surfaces of Cultivated Soils Tends to be Drier
- Double Crop Depletes Soil Water
- Little Difference Between No-till Fallow and Cultivated Sub Soils
Continued Research Activities

- Relate Data to Mesonet Data
- Calculate soil water Balances
  - Drainage, Runoff, ET, Storage
- Relate Soil Water Status to Crop Rotation Performance
Questions?