



# Conservation Systems Research

RESEARCH PROJECT DESCRIPTION No. 11

## *Park the Disk and Use the Chisel*

United States  
Department of  
Agriculture

Agricultural  
Research  
Service

National Soil  
Dynamics Lab

Conservation  
Systems  
Research



*Disking sorghum*

Research  
Project  
Report  
No. 11

October 2002

Contact us:

USDA-ARS-NSDL  
411 S. Donahue Dr.  
Auburn, AL 36832  
334-844-4741 x179

<http://msa.ars.usda.gov/al/auburn/nsdl/csr>



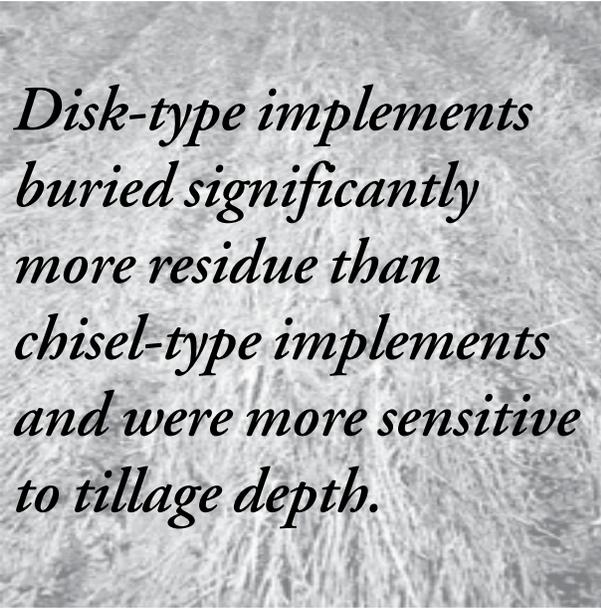
### Researchers

R.L. Raper (Agricultural Engineer), S.A. Prior (Plant Physiologist), M.L. Norfleet (Soil Scientist, NRCS-Soil Quality Institute), L.E. Wagner (Agricultural Engineer - ARS, Manhattan, KS), R.A. Zemenchik (Agronomist - CASE-IH / New Holland)

### The Challenge

Decisions about type and use of tillage tools affect growers' abilities to conserve energy, retain residue on the soil surface, and sequester carbon. Improper selection or use wastes energy, buries residue, and hinders adoption of conservation systems.

Understanding the effects of different tillage strategies should allow



*Disk-type implements buried significantly more residue than chisel-type implements and were more sensitive to tillage depth.*

growers to make appropriate choices about tillage tools, depths, and speed of operation to conserve the maximum amount of carbon in their soils.

### **The Experiment**

We conducted an experiment to determine the amount of residue that is covered as a function of:

- tillage type (chisel- vs disk-type);
- tillage depth (3 in. vs 6 in.); and
- tillage timing (time of year) (fall vs spring).

To evaluate the treatment effects we measured:

- residue cover;
- residue mass;
- residue decomposition;
- soil strength;
- soil moisture; and
- draft force.

### **What We Have Learned**

Disk-type implements buried significantly more residue than chisel-type implements.

Disk-type implements buried substantially more residue when tillage depth was increased. Chisel-type implements, however, were found to bury similar amounts of crop residue at different tillage depths.

The time of year that tillage occurred was not found to affect the percent residue cover nor the total mass amount of residue remaining on the soil surface in the spring of the year.



*Chisel sweep*

#### **Related Publications**

Raper, R.L. 2002. The Influence of Implement Type, Tillage Depth, and Tillage Timing on Residue Burial. submitted to the Power & Machinery Division of ASAE. *In press.*