



# Conservation Systems Research

RESEARCH PROJECT DESCRIPTION No. 12a

## *Using Soil Moisture to Determine When to Subsoil*

United States  
Department of  
Agriculture

Agricultural  
Research  
Service

National Soil  
Dynamics Lab

Conservation  
Systems  
Research



*In-row subsoiler*

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Research  
Project  
Report  
No. 12a

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### Researchers

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Contact us:

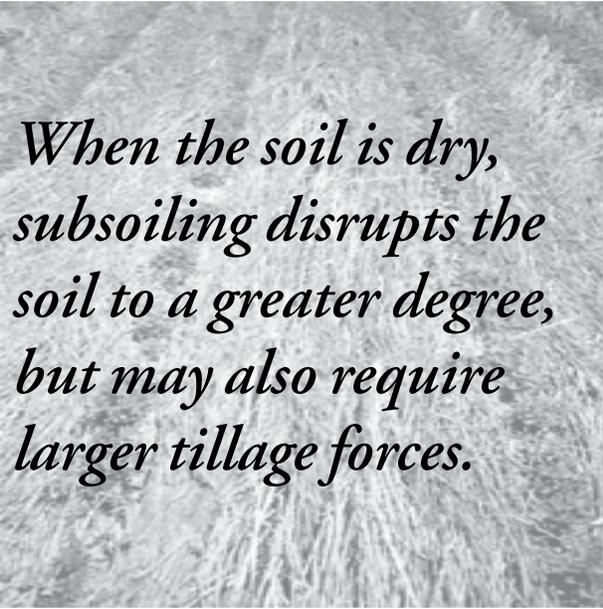
USDA-ARS-NSDL  
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<http://msa.ars.usda.gov/al/auburn/nsdl/csr>



### The Challenge

Deep tillage tools are necessary to disrupt compacted soil layers in many Southeastern fields. When to till is largely governed by the availability of the producer's time. However, the timing of subsoiling can have a great effect on its effectiveness and on the ability to pull equipment easily through the soil.



*When the soil is dry, subsoiling disrupts the soil to a greater degree, but may also require larger tillage forces.*

## What We Have Learned

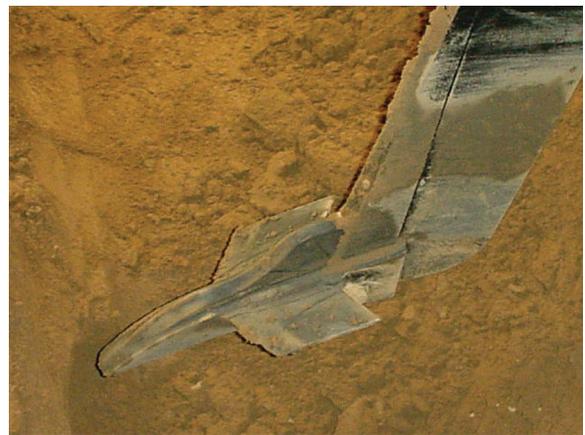
Extremely dry soil requires greater tillage forces than any other level of soil moisture.

Tilling extremely dry soil produces the greatest soil disruption, both on the surface and in the subsoil zone.

Minimum-tillage subsoiler shanks minimize surface soil disruption as intended, but require more draft force to go through the soil than do straight-shank subsoilers.

## The Experiment

Experiments were conducted in the soil bins of the NSDL to determine the draft required for tillage at several values of soil moisture for a standard subsoiler and a conservation tillage subsoiler. Measurements of tillage force and soil disruption were used to determine the most effective method of tilling the soil while maintaining adequate amounts of surface residue.



*Subsoiler shank*

## Related Publications

Raper, R.L. and A.K. Sharma. 2002. Using Soil Moisture to Determine When to Subsoil. *In* E. van Santen (ed.). Proceedings of the 25<sup>th</sup> Southern Conservation Tillage Conference for Sustainable Agriculture. 24-26 June, 2002, Auburn, AL. AL Expt. Sta. Spec. Rep. No. 1.