UNIVERSITY OF MISSOURI Extension

Consequences of Soil Compaction

Charles Ellis
Field Specialist in Ag Engineering
University of Missouri Extension
ellisce@missouri.edu
636-528-4613

1

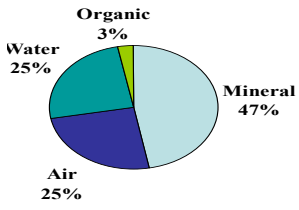
UNIVERSITY OF MISSOURI Extension

Will My Soils Compact?

2

UNIVERSITY OF MISSOURI Extension

Soil "Composition"

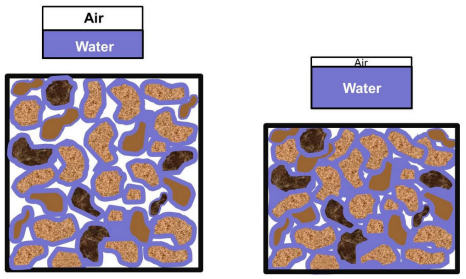


- Soil structure in its natural state.
- Can temporarily increase air percentage with tillage.

3

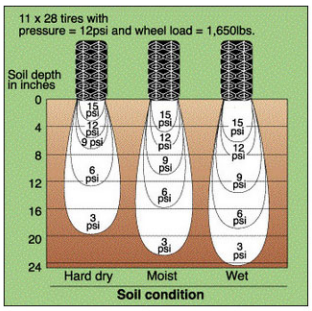
The archived presentation will be available at:
https://lpelc.org/archived-webinars/

Soil Compaction



4

Depth of Compaction



5

Diagnosis of Compaction

- Reduced soil drainage.
- Slow crop growth, root development.
- Deformed or flattened roots.
- Increased soil bulk density
- Poor soil structure.
- Increased plant injury from soil-applied herbicides.

6

The archived presentation will be available at:
https://lpelc.org/archived-webinars/

Effects of Compaction

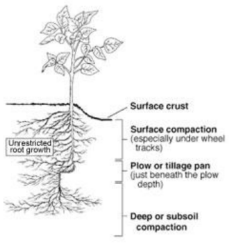
- Decreased Infiltration
  - Decreased Water Storage
  - Increased Soil Erosion
- Decreased Root Growth
  - Reduced N Uptake

7

Effects of Compaction

8

Effects of Compaction

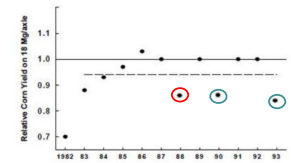


Compaction Areas
- Surface from wheel traffic.
- Tillage pan.
- Deep/Subsoil.

9

University of Minnesota

Relative Yield to Control



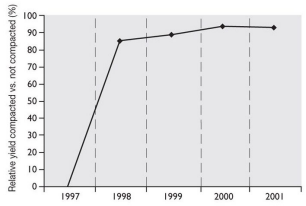
Soil Compaction, University of Minnesota Extension, Jodi DeJong-Hughes, Extension Educator

- One time compaction of 20 tons per axle.
- 12-year relative corn yields.
- Within 5 years yields back to normal during normal growing conditions.
- **1988 low precipitation**
- **1990 and 1993 high precipitation**.

10

Kentucky No-Till

Relative Yield to Control

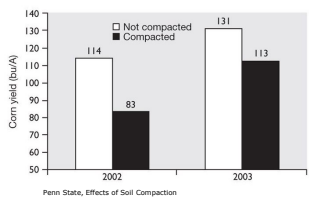


Penn State, Effects of Soil Compaction Murdock, L.W. 2002.Personal communication

- Extreme compaction initially done in top 12 inches.
- First year yield only 2 percent of uncompacted yield.
- 85 percent yield the second year.

11

Penn State Trial



Penn State, Effects of Soil Compaction

- No-Till
- 30-ton manure truck, tires 100 psi.
- 2002 dry year.
- 2003 wet year.

12

The archived presentation will be available at:
https://lpelc.org/archived-webinars/

Final Thoughts

- Soil compaction can affect crop yield, particularly in the first year after the compaction occurs.
- Soil compaction yield loss is greater in "**stressed**" cropping seasons.
- Soils have a resiliency to recover from soil compaction.

13