

Effective Aerification of Sports Fields

Roch Gaussoin, PhD
 Professor & Extension Turfgrass Specialist
 University of Nebraska-Lincoln
rgaussoin1@unl.edu
[@rockinsince57](https://twitter.com/rockinsince57)

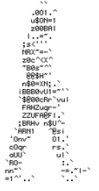



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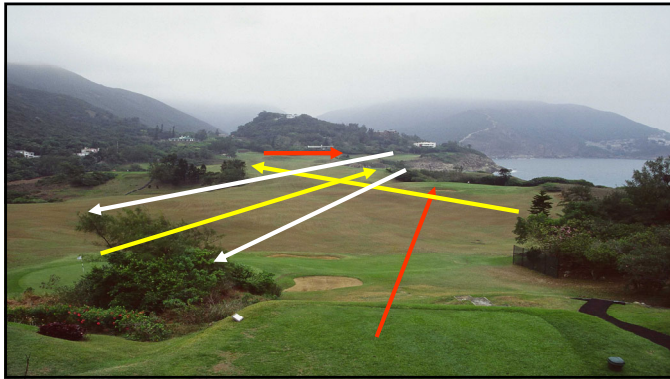
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Causes and Locations of Traffic Stress

- Foot traffic
- Equipment
- Golf carts/Utility Vehicles



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Underground: Sight Unseen

- Plants are immobile
- Often forgotten
- Large impacts on growth and development
- Water
- Nutrients

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Landscape
**“The ~~Nation~~ that destroys
 its soil destroys itself”**
 Franklin D. Roosevelt

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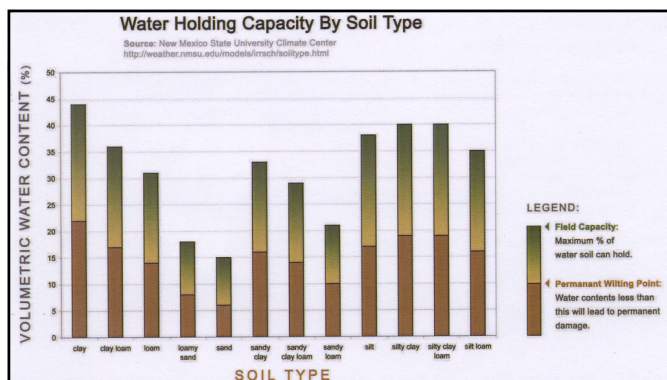


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Soil Texture Problems

- Air/water movement
- Root development
- Water holding capacity
 - Irrigation requirements
- Nutrient holding capacity
 - Leaching potential
 - Fertilizer requirements
- Soil microbial populations

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Soil Structure

- Impacts
 - Water infiltration
 - Root development
 - Microbial populations
 - Other critters
 - Overall plant health

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Soil Bulk Density

- Density of the bulk soil in its natural state, including both particles and pore space
- Inversely related to porosity
- Organic soils have lower bulk densities
- Sands have higher BD than clays
- Impact how the soils perform

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Where do roots grow??

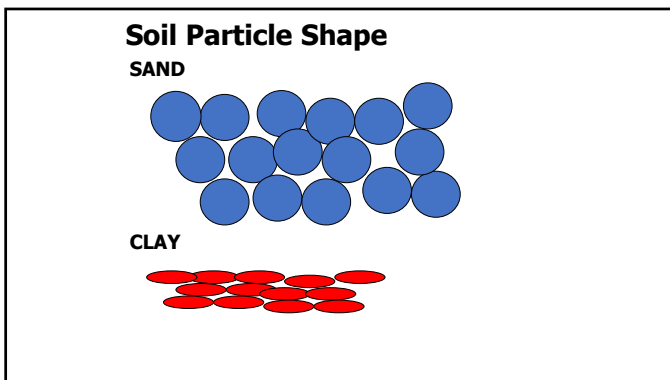
**Roots do not grow *in the soil*,
they grow in the *air space*
in the soil.**

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Soil Porosity

- Amount of air space (pores) in the soil normally expressed as a %
- Based on size and shape of soil particles
- Pore size
 - Macropores
 - large
 - aeration, infiltration
 - Micropores
 - small
 - water holding
 - nutrient holding

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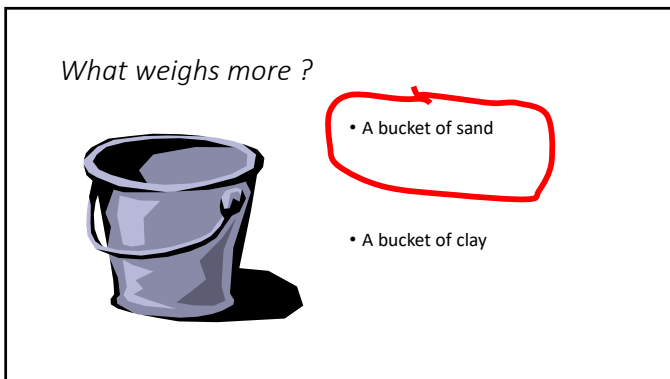


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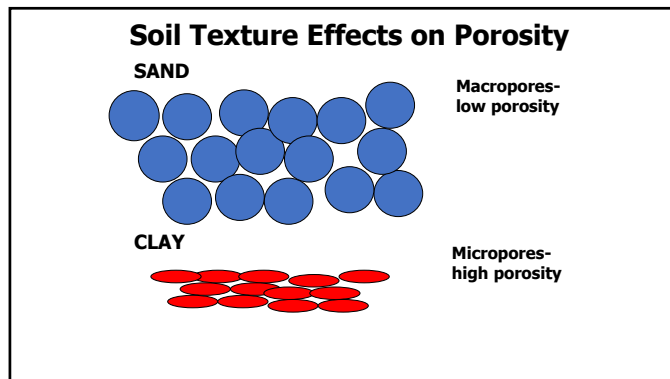
Which soil has higher porosity?

a. **Sandy**
b. **Clayey**

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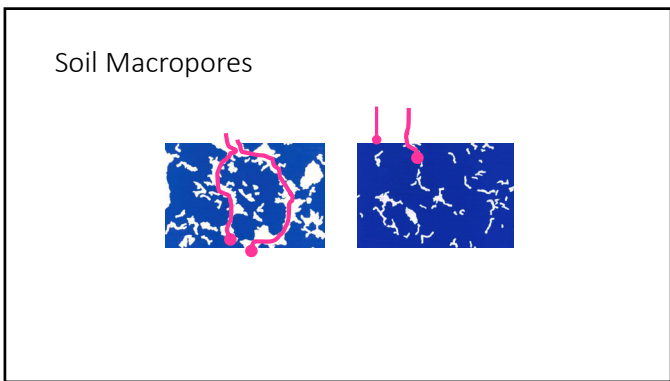


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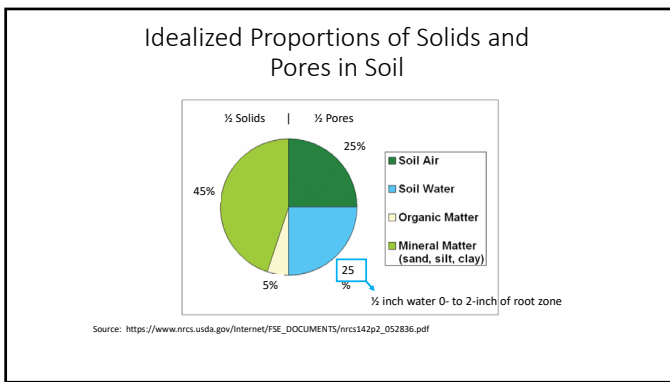
Air and water movement through soils

- Water infiltration
 - Macropores
 - Pore space continuity
- Water holding
 - Micropores
- Air movement
 - Pore space continuity
 - Micropores are barriers for movement
- Desirous to have 50% porosity
 - Half water
 - Half air filled

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Compaction is the compression of soil particles resulting in loss of pore space in the soil profile resulting in a decrease in soil aeration and water infiltration

Clays and silts have a high capacity for compaction; sands do not

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To maintain optimal plant growth the entire volume of air to a depth of eight inches must be renewed every hour

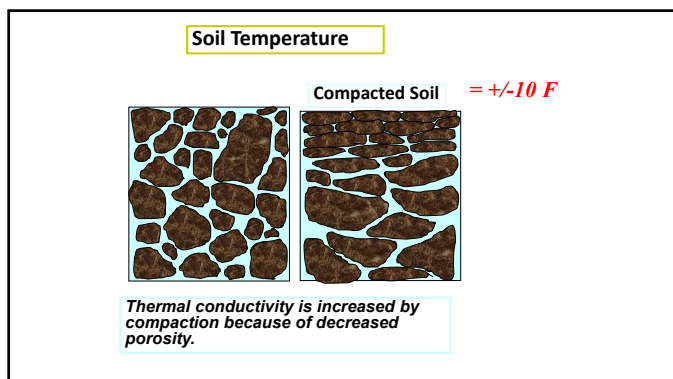
Why?

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Where do roots grow??

Roots do not grow *in the soil*, they grow in the *air space* in the soil.

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Improvement of compacted soils?

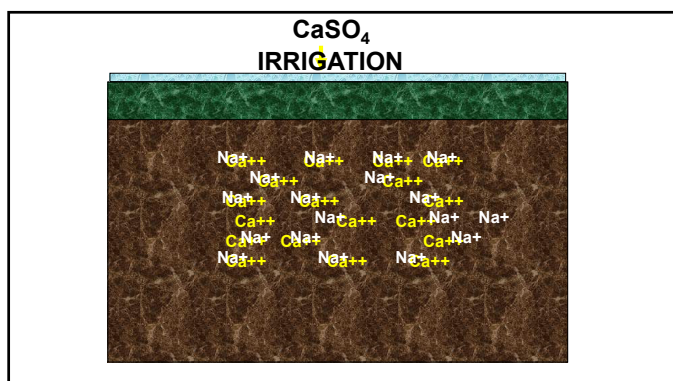
- Wetting Agents
 - Improve short term water infiltration in hydrophobic soils
- Gypsum (CaSO_4)
 - "soil buster"
 - Only effective in sodic (sodium affected soils) with good drainage
 - Ca effect on soil structure not compaction relief

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Reality

Gypsum (calcium sulfate) is used to improve aggregation of silt-crusted puddled soil or soil damage/ dispersed by excess sodium.

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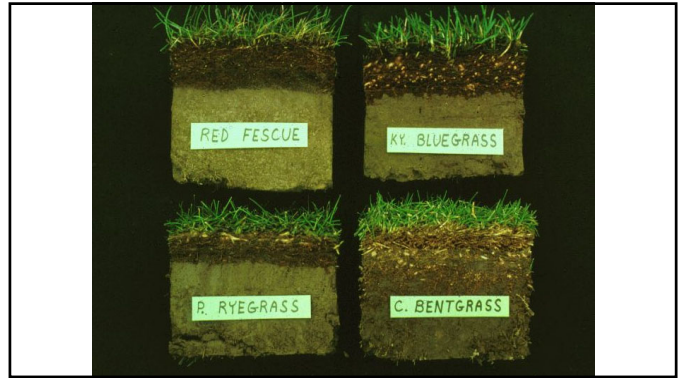
Thatch

A loose, intermingled, organic, layer of dead and living shoots, stems, and roots that develops between the zone of green vegetation and the soil

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Why does thatch occur?

- Rate of organic matter production exceeds ability of micro- and macro-organisms to decompose this material
- Management practices discourage activity of micro- and macro-organisms



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Thatch: The Negative




- Can become hydrophobic (water repellent)
- Porous; poor water retention
- Difficult to rewet
- Poor N and K retention
- Increased weed, disease, and insect problems
- Decreased pesticide effectiveness (insecticides)

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Layering

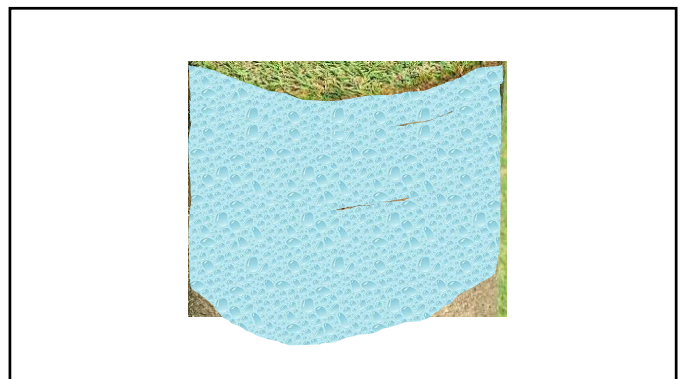
- Water retention is non-uniform
- Thatch/mat layers can store twice as much water than the root zone



NOT a function of drainage

Rather it is the difference in pore size distribution among layers


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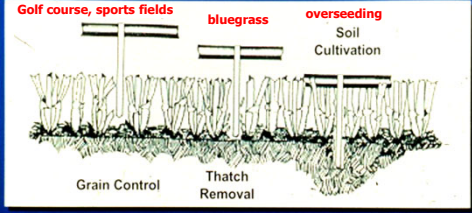
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Turfgrass Thatch/Compaction Remedies

- Cultivation techniques
 - Core cultivation
 - Vertical mowing



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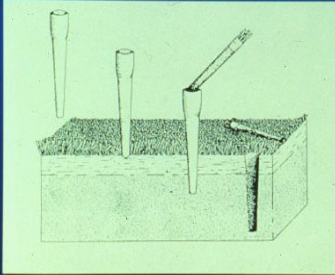


Vertical mower blade depth dictates desired effect

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Core Cultivation

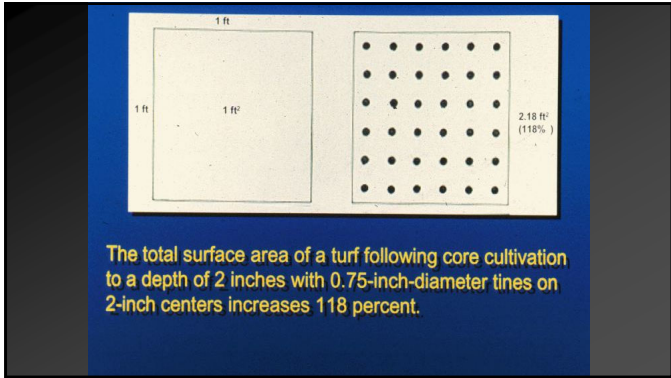
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The total surface area of a turf following core cultivation to a depth of 2 inches with 0.75-inch-diameter tines on 2-inch centers increases 118 percent.

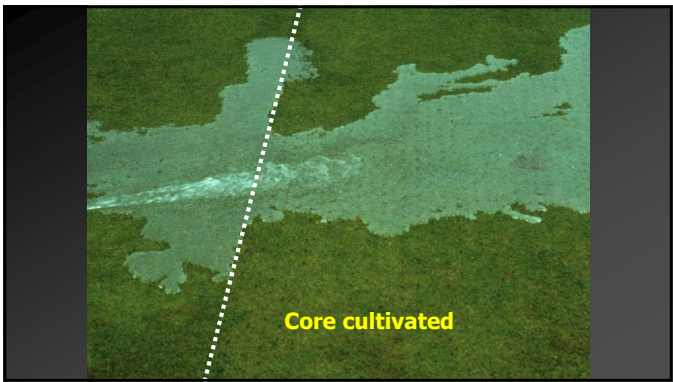
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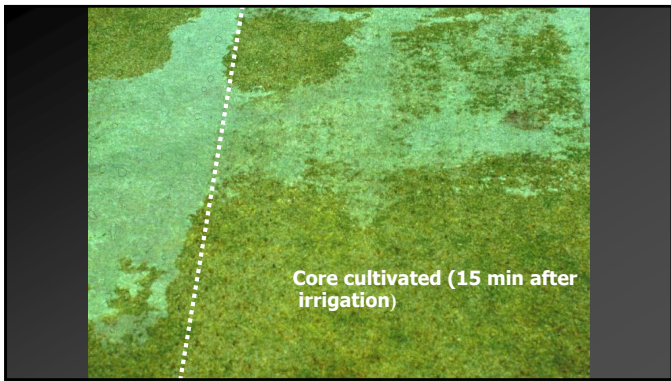
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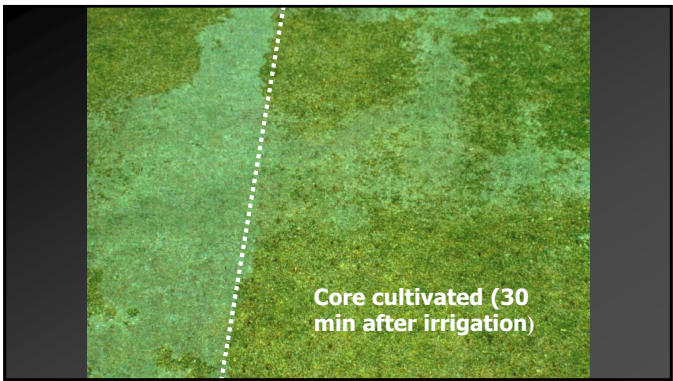
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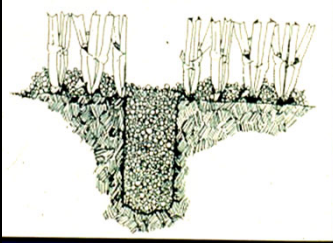
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Dragging cores, post cultivation, into the turf is topdressing

Topdressing after core cultivation



Topdressing material for lawns can be compost or other amendments but not sand

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Mat

Thatch that has been intermixed with mineral (soil) matter. Biologically Active & critical for healthy turfgrass

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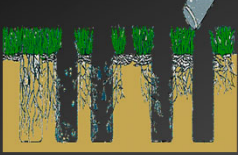
Frequently Asked Questions

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When is the best time to core cultivate ?



- Spring
 - Active root growth is occurring
 - Just prior to irrigation season
 - Good time for overseeding
- Fall
 - Will stimulate some root growth
 - Good time for overseeding
 - Takes advantage of winter freeze/thaw cycles
- Summer
 - Less desirable due to heat, excessive drying problems

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How often can you core cultivate?

- Depends on soil type, amount of thatch, level of compaction
- At least yearly for the average location
- More often for thatchy, compacted turf
- Combine with overseeding or fertility

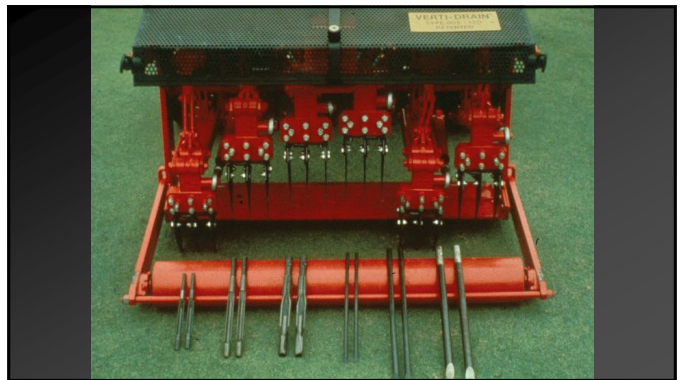
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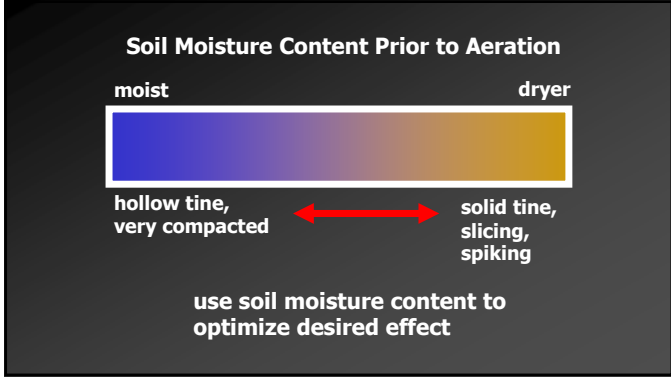
DryJect

- 1 High pressure water blasts an aeration hole in the root zone, shattering action relieves compaction
- 2 Dry or wet material is drawn into the hole by a patented vacuum effect created by the water blast
- 3 In a fraction of a second, the root zone is aerated, soil amendments fill the hole completely and the surface is ready for play

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Thanks!

Roch Gaussoin
rgaussoin1@unl.edu

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