Soil Compaction in managed landscapes

Soil compaction occurs when soil particles are pressed together; increasing soil density and decreasing pore space. Air and water movement are greatly reduced, leading to poor water infiltration and drainage and limiting plant growth.

Clear signs a soil is compacted

Lack of drainage and infiltration → ponding water on surface

Surface crusting → increased runoff and erosion

Plant stunting and discoloration → nutrient deficiencies/water stress

Compacted soils do not function properly!

Common causes of soil compaction

- **Tillage –** this is a short-term fix, but over time it results in decreased soil organic matter and destroys soil structure. Good structure and organic matter levels help prevent compaction!
- **Working wet soil** – soils that are too wet have lower soil strength and are damaged more easily
- **Excess weight** – vehicles, construction activities, heavy foot traffic, and riding mowers compress the soil, reducing pore space
- **Leaving soil bare** – water droplets hitting a bare soil surface causes splash erosion; leading to surface crusting and blocking water penetration into the soil profile. Keep the soil covered!

Remediating compacted soils

- **Use organic amendments –** incorporating amendments such as mulch, compost, and biochar, into the soil or on top, increases water and nutrient retention and enhances microbial activity
- **Plug aeration**– a safe alternative for existing landscapes to improve drainage with minimal effect on established plant roots or turfgrass
- **Air tilling & radial trenching**– safe options around established trees that won't damage roots and will loosen soil. For radial trenching backfill trenches with gravel and then soil
- **Soil replacement** – this is a last resort! Very intensive and expensive. Only practical for small areas when no other methods can improve the existing soil

Questions? – contact Emily Berkowitz, Agricultural Stewardship Specialist
(631-740-0268 or el684@cornell.edu)