

Soil test reveals need for amendments

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Soil management includes the modification of soil's chemical and physical properties. Turf problems related to soils are often misdiagnosed, ignored or forgotten because they're below ground.

Cultural management

The soil physical management tool box contains methods such as:

- ▶ Cultivation: coring; slicing; spiking; grooving; water and air injection; drilling; solid tine cultivation.
- ▶ Amendments, either physical, chemical or biological.

Cultivation increases infiltration and percolation of water and other materials—such as nutrients and control products—through soil.

Cultivation removes unwanted layers, helps overseeding, helps with thatch management and improves the health and vigor of the site.

All types of cultivation only have a positive influence on a small zone of soil surrounding the cultivation hole.

A dye movement study by Dr. Panayiotis Nektarios while a graduate student at Cornell University revealed that most forms of cultivation studied positively influenced the 0.5 to one inch of soil around the cultivation hole.

Water injection had a larger zone of influence up to two-inches of soil at the bottom of the hole. For best impact, cultivation tine spacing should be no greater than two inches on center, which can be accomplished by narrow tine spacing units or multiple passes.

Soil amendments

There are physical, chemical or biological types of soil amendments. Some, such as organic matter, can influence all three areas. Others, like sand, may influence the physical properties (water movement; moisture holding; compaction resistance; aeration).

A major concern is how sta-

Symptoms of soil problems

If your turfgrass behaves in the following ways, it's a sign that there's trouble down below, and time to investigate for compaction or nutrient deficiencies:

- ▶ shallow but extensive root system
- ▶ little or not roots below four-inches.
- ▶ little or no top growth
- ▶ off-color, very chlorotic tissue
- ▶ easily wilted
- ▶ low density with weeds
- ▶ poor response to fertilization and soil applied pesticides
- ▶ prolonged wet soil that limits recreational uses
- ▶ water easily runs off the turf surface.

Some sites may have all of the above symptoms, while others may have just a few. Some symptoms may take a long time to show (root growth), while others are quickly visible (top growth).

Many other factors can cause the symptoms described above, making a definitive diagnosis nearly impossible. Thus, soil management is often considered an art more than a science.



The soil sample reveals soil layering characteristics, possible compaction, and soil nutritional needs.

ble the amendment is, especially if used to amend sand. If the amendments to sand break down into very fine particles, the site may not drain as well.

Amendments can partially amend soils (topdressing or shallow incorporation into the root zone) or complete incorporation into the root zone. Factors involved: 1) The time one can wait for positive results. Topdressing is long term, while complete root zone modification is a quick fix.

2) The amendment used.

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SOURCES OF SOIL AMENDMENTS AND THEIR INFLUENCES

| Source | Amends soil | Properties improved | | | Degradation forces* |
|-------------------|-------------|---------------------|----------|------------|---------------------|
| | | Physical | Chemical | Biological | |
| sand | soil | yes | no | no | C/T |
| calcine clay | sand/soil | yes | yes | no | W/T |
| calcine diatomite | sand/soil | yes | no | no | W/T |
| natural zeolites | sand/soil | yes | yes | no | W/T/C |
| organic matter | sand/soil | yes | yes | yes | B |
| soil | sand | yes | yes | yes | |

*Forces involved in degrading amendments include: C-chemical; T-Traffic; W-Weathering; B-Biological.