Soil compaction is trouble in hiding

■ It's the green industry's version of an oil leak or tooth decay.

You don't know it's there until you notice something's wrong, and by then it may be too late. But when you look for it, it's hard to miss.

It's soil compaction, and it's often responsible for weakening turf to the point of susceptibility to other problems.

The key area of concern in cool-season turf is the top three to four inches which contain the bulk of the roots, says soil expert Dr. Paul Rieke of Michigan State University.

Aerate droughty turf every year. Remove cores ½ to ¾ inches in diameter, at a depth of up to six inches. This will improve permeability of the sod to rain and watering. This treatment also improves soil aeration and deeper rooting. Since the core holes permit much easier and deeper penetration of fertilizer and lime in situations which merit such treatment, aerification will help root development, and the yearly accumulation of dead roots will improve soil structure to the depth of rooting.

Certain soils compact more easily than others. The situation gets worse when you add heavy traffic to the picture, as on a golf green.

Compaction prevents moisture and nutrients from reaching the turf roots. Wet, waterlogged soil in heavy traffic compacts quickly. Grass will begin to thin out, and eventually bare spots and weeds will result.

Solution: aerify and remove soil cores in late fall or early spring. Go in several directions for best coverage.

Do a light overseeding, then water heavily. The water will wash the seed into the newly formed core holes. Fertilize and seed bare spots before watering.

Some turf experts believe core aeration is best when done after Labor Day, so the holes can heal over before winter. In cool-season turf regions, soil is drier in fall and the temprature and moisture conditions are more favorable and more predictable, and you have more time to fit it into your schedule.

—Sources: "Turfgrass Management" by Dr. Al Turgeon, Reston Publishing, 1980; "Ask The Lawn Expert," by Paul N. Voykin; MacMillan, 1976.

Coring cures COMPACTION

■ Coring offers a solution to compacted turf, but not without some disadvantages.

ADVANTAGES

- release of toxic gases from the soil
- improved wetting of dry or hydrophobic soils
- accelerated drying of persistently wet soils
- increased infiltration capacity, especially where surface compaction or thatch limits infiltration
- stimulated root growth within the holes
- disruption of soil layers resulting from topdressing
- control of thatch, especially where soil cores are reincorporated or where topdressing follows coring
- improved turfgrass response to fertilizers

DISADVANTAGES

- temporary disruption of the turf's surface
- increased potential for turfgrass dessication as subsurface tissues are exposed
- increased weed development when conditions favor weed-seed germination
- increased damage from cutworms and other insects that reside inthe holes.

Soil amendments can be used to alleviate soil compaction. Companies which manufacture these amendments include Aquatrols, headquartered in Cherry Hill, N.J.; Bonide Products, Inc. of Yorkville, N.Y.; Four Star Services, Inc. of Bluffton, Ind., and Innova Corp. of Westminster, Colo.

Earthworms: we need attitude adjustment

Turf managers want to get rid of them, but earthworms are a vital part of the turf ecosystem.

by Pam Elam

■ Every season, I receive calls from concerned golf course managers, landscapers and homeowners about the little piles of soil that are brought up each day by industrious earthworms.

While their concern is noted, it is important to understand the valuable role earthworms play in the overall turfgrass ecosystem:

- Earthworms help to mix surface organic layers, or thatch, with the underlying soil profile.
- In their burrowing activity, earthworms increase aeration and water movement into the soil and increase root health of the turf.
- Earthworm castings help soils develop good structure and lower soil bulk density.

All of these activities are important to maintain a healthy and long-lived turf.

The types of conditions that support or deter the development of earthworms are associated with the same management practices that correlate to thatch accumulation.

For example, acid or soil pH of 5.0 and below favors thatch development. And research shows that few earthworms reside under turf in acid soils.

Also associated with acid soil conditions are poorer soil aggregation, higher soil bulk density and greater resistance to penetration. In 1985, Dr. Daniel Potter reported that an increase in soil acidity due to acid-type nitrogen fertilizers (like ammonium sulfate) brought with it a concurrent increase in thatch and a decrease in earthworms.

Earthworms prefer moist, medium to fine textured soils with high amounts of organic matter, adequate amounts of calcium and a moderate soil pH.

Another factor that might be associated with earthworm activity is pesticide use. Clearly, chlorinated hydrocarbon-type insecticides are toxic to earthworms. Some herbicides, specifically DCPA (Dacthal) have been associated with decreased earthworm activity. However, Cole & Turgeon (1978) suggest that thatch accumulation was not related to reductions in earthworm activity after DCPA application but rather primarily attributeed to reduced microbial activity.

With other herbicides such as bensulide (Betasan), the data show no significant extra thatch development. Dr. Turgeon, in fact, found less thatch with some pre-emergence herbicidal treatments, possibly due to a reduction in grass growth and herbicide toxicity to earthworms and other soil organisms.

So it is unclear how much pesticides affect earthworms. What is also unclear is how much and how direct the link is to pesticide use, thatch developement and earthworm activity.

While it is known that earthworms are important in thatch reduction, we don't know how much and to what percent might be more attributable to other micro-organisms. We also don't know enough about the effect of pesticides on earthworms, micro-organisms and to other critters in the soil.

Considering the importance of soil organisms in the breakdown of nitrogen to available forms for plant use, organic matter decomposition and other soil process, research in these areas could have a significant impact on our management practices. However, what is clear are the other benefits of earthworms to the development of good soil structure and what they tell you about the quality of your turf and soil ecosystem.

So what is needed is an attitude adjustment about earthworms bringing up little piles of soil. Look at alternatives to managing earthworms rather than trying to totally prevent them.

Some suggestions:

1) Sweep golf greens regularly with a broom to remove the castings and dirt piles.

2) On residential turf, consider mowing higher where the symptoms are not so obvious.

3) Drop soil pH by using acid-type fertilizers.

4) Increase soil aeration by core aeration and/or vertical mowing which may reduce the degree of burrowing.

However, remember the consequences of such actions: decreased soil aggregation, more thatch, greater bulk density and a possible increase in moss and algae.

—Pam Elam is a farm advisor in environment horticulture for the Fresno (Calif.) County Extension Service. This is an excerpt from a piece in "Pro-Hort News," Spring, 1993.

Here's how to save water

■ Here are some tips on saving irrigation water from the University of California Cooperative Extension Service:

Turf:

- Early AM watering cuts evaporation.
- Water lawns separately from trees, shrubs and groundcovers, if possible.
- Remove thatch in spring if it's more than one-half inch thick. Thatch should not be removed in the heat of the summer.
- Weeds steal nutrients; control them.
- Fertilize moderatly, apply at the low end of recommended rates.
- Keep lawns mowed at the right height: 1.5-3" for tall fescue, 1.5-2.5" for perennial ryegrass and Kentucky bluegrass; 0.5-1" for bermudagrass and zoysiagrass; 0.5-1.5" for St. Augustinegrass.
- Aerate to prevent soil compaction. Proper aeration requires removing plugs. Clay soils need regular aeration.

Trees:

- Water trees separately from surrounding plants. Trees prefer fewer, deeper waterings than grass.
- Water to a depth of two to three feet to help promote deep rooting.
- Keep turfgrass and other plants at least one foot from tree trunks.
- Apply mulch around trees, keeping it a few inches away from tree trunks.
- Control weeds around trees.
- Avoid soil compaction around trees.
- Do not routinely fertilize landscape trees.
- Prune only when necessary: remove dead and diseased wood, dangerous branches, and suckers growing from the base of the tree.