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Know your soil

Realizing the importance of healthy soil can help you diagnose and treat its problems

BY JOHN FECH

Soil is the lifeblood of landscapes. Even though it provides nutrients and water and serves as anchorage for plants, it's taken for granted and commonly overlooked by the general public and landscape professionals alike. This article will point out the fallacy of that assumption and show that soil is one of the most important components of a healthy landscape.

Good soil/bad soil

Good soil is so crucial to landscape health that it's usually the first factor I consider during pest diagnosis inspections. A soil probe, bucket and screwdriver are helpful in determining soil attributes and how it stacks up against the ideal. Trees, shrubs, annuals/perennials, grasses, bulbs and groundcovers growing in well-drained, fertile, slightly acid soils normally perform well, with attractive flowers and green leaves, providing beauty and function for the property.

When plant roots are forced to grow in poor soils, they not only grow slowly and develop abnormally but are susceptible to insects and disease infestation.

Pests are repeatedly attracted to weakened, stressed out turf and ornamentals. The same is true in the animal kingdom; when watching one of those animal shows on The Discovery Channel, you learn that the lioness always sets her sights on the sickest or oldest wildebeest. As such, good soils are a hallmark of Integrated Pest Management, as trees and turf growing in a healthy medium will be able to resist a higher level of pest activity than weak ones growing in poor soils.

What's the problem?

So why do we have this problem of poor soils — soils with extreme pH, heavy clay, excessively well-drained, low on nutrition — in the first place? Many fingers can be pointed at the housing and construction industry because construction disturbs soil dramatically. It seems the larger the equipment, the more the soil is messed up.

The two most common disruptions are soil profile changes and soil particle compaction.

When a basement is dug or extensive grading is performed, soil that was in one place is moved to another. Careless equipment operators often bring subsoil to the surface and redistribute it as a final grade for the landscape pro-

fessional to use for plant installation. Subsoil is low in fertility and is usually either sticky clay or rocky chunks, neither of which support good plant growth.

Conscientious construction companies direct their operators to remove the topsoil for stockpiling off-site, then excavate what's needed for the basement. After the rough grade, the topsoil is then redistributed and spread out, and the final grade established.

If soil profile changes aren't to blame for poor soil, it might be compaction, which is

caused by heavy construction equipment pressing soil particles together and eliminating essential voids, or air spaces. These air spaces provide oxygen to the roots and avenues for excess water to drain out of the root system. Compaction is more likely to occur if the soil is wet when the equipment moves over it and/or if it's mostly comprised of clay or silt.

Let it drain

Ideally, soil would be comprised of half air spaces and half mineral

RAISING PH WITH LIMESTONE

(pounds of ground limestone per 1,000 sq. ft.)

change in pH desired	sandy soil	silty soil	clay soil
4.5 to 6.5	50	160	200
5.0 to 6.5	40	130	150
5.5 to 6.5	30	90	100
6.0 to 6.5	15	50	55

LOWERING PH WITH SULFUR

(pounds of elemental sulfur per 1,000 sq. ft.)

change in pH desired	sandy soil	silty soil	clay soil
8.5 to 6.5	45	60	70
8.0 to 6.5	30	35	45
7.5 to 6.5	10	20	25
7.0 to 6.5	3	5	7

Masonry work, especially around the foundation of a house, can cause problems with soil pH.



components. When compaction occurs, soil particles are pressed together, causing just about anything with a root to suffer. Why?

All plants have an optimal amount of water and air they need for root growth. In poorly drained soils, the voids between soil particles fill up with water faster than it can flow out, and the roots don't get the oxygen they need. If this condition continues for an extended period, the roots will rot or stop growing, causing the plant to wilt or take on a scorched appearance.

Another common drainage issue is that of the perched water table, which occurs when horizontal layers of soil are created, each with different soil characteristics such as organic

matter, large air spaces, clay content and pH. The most dramatic difference is when a layer of soil with large air spaces exists over one that has small air spaces. The laws of soil physics prevent water from the top layer to pass quickly into the second layer. Instead, the rate of downward water movement is dramatically slowed, forcing most of the water to rise vertically.

The downside to a perched water table is that the roots are wetter than they need to be, and they decline. Ironically, this is what happens when misguided landscape professionals

add a layer of compost, sand or peat moss on top of a heavy clay layer in an attempt to improve the site's drainage. "Fixing" these problems is discussed under the section on soil modification at www.landscapemanagement.net.

Good soil mix

Over the years, various soil types' attributes have been fairly well-documented. Clays hold water and nutrients tightly, and tend to produce fertile landscape soils that drain

continued on page 44

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Construction activities can cause pH changes as well as soil compaction and layering. This creates difficult growing conditions for turf and landscape plants near the foundation of a building or house where considerable amounts of concrete, gypsum and other materials can accumulate.

continued from page 43

poorly. Sandy soils allow for excess water drainage, yet can cause plant stress from drought and lack of nutrients. Silty soils are somewhere in between these two extremes, usually on the clay side in terms of drainage and nutrient-holding capacity.

Extreme soil types present challenges to landscape professionals, but soils with low levels of organic matter pose even more difficulty. Organic matter is deposited in soils over time, filtering in from the decomposition of tree leaves, thatch and other plant remains. It serves as a loosening agent in heavy soils, and a holding agent in well-drained soils. A desir-



Application and incorporation of compost helps with the aeration of soil.

able level is between 3%-5% of the total soil volume.

The relative alkalinity or acidity (soil reaction) of a soil is another component to

consider. The optimal level of pH for most landscape plants is between 6.0-6.7. Exceptions include clematis, azaleas, holly, rhododendron, blueberry and many conifers, but for the most part, optimal growth is observed when the level is slightly acid or neutral.

It's common for construction activities to cause pH changes as well as soil compaction and layering. This can create difficult growing conditions for turfs and landscape plants near the foundation of a building or house, where considerable amounts of concrete, gypsum and other materials being mixed can spill. These building products tend to be alkaline, and can create "hot spots" in soil, especially in the areas where portable concrete mixers and wheelbarrows were parked.

At pH levels above or below optimal, certain nutrients such as iron, phosphorous and manganese become unavailable to plants. Plants growing in soils with these pH levels appear stunted, chlorotic or misshapen and distorted. The classic problem of pin oak chlorosis falls into this category, with high pH soils tying up the iron needed by the plant. The result is yellow leaves produced on stunted-looking stems. Left unchecked, many plants suffering from iron chlorosis eventually die.

Soil modification

If your soil isn't up to snuff, you may want to offer soil modification. More details are available on-line at www.landscapemanagement.net. **LM**

— John Fech is a horticulture educator for the University of Nebraska Cooperative Extension.

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TECH CENTER

Efficiency is key to profitable cleanup

BY CURT HARLER

Mike Gilmore, owner of Growing Solutions, Lutherville, MD, knows a landscape professional makes money only when moving quickly from one job to the next.

Gilmore's company can aerate and clean 25 acres a day. He runs two Deere TC125 material collection systems behind four aerators. He'll likely obtain a third TC125 next season. "It's a great machine with simple setup. It does an effective job," Gilmore says.

Gilmore, partnering with a designer on Maryland's East Shore, is developing a machine that shreds the aerator plugs and blows the mulch out the back. "That would make the job even quicker," he says.

A.M. LEONARD 937/773-2694

The angled double-diamond brushes on the Gandy Sweep Master turf brush blends light or heavy topdressing into the surface. Available with Cushman Truckster hydraulic package, manual lift tow hitch and other features.

Circle #260

JOHN DEERE 800/537-8233 www.deere.com

John Deere's TC125 Turf Collection System tow-behind attach-



ment allows one person to pick up and dump aeration cores, sand, clippings, leaves or thatch. It covers a 48-in. swath. Hopper capacity is 25 cu. ft.

Circle #261

FOSTER 262/633-7073 www.fostermfgcorp.com

The Professional Cart from Foster Manufacturing, Racine, WI, has a steel undercarriage and moves on two 26-in. pneumatic tires mounted on reinforced, spoked rims.

Circle #262

JRCO, INC. 800/966-8442 www.jrcoinc.com

The Model 490 Transporter from JRCO, Minneapolis, MN increases grass catcher's capacity by holding excess grass and leaf clippings, and transports mulch, landscape materials and line trimmer.

Circle #263

KADCO USA 800/448-5503

The Carry-It cart from Kadco USA,



▲ Minuteman-Parker's Scavenger sweeper

Buying tips

- ▶ Look for adjustable brushes and rollers on sweepers
- ▶ See if there are hydraulic dumps on material collection systems
- ▶ Check hopper capacity
- ▶ Check load capacity

Amsterdam, NY, is lightweight but made of high molecular polyethylene. Its 5/8-in. solid axle is welded to a three-in. wide steel plate.

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877/596-6337

www.littlewonder.com

In the optional swivel wheel kit for the high-output blowers from Little Wonder, Southampton, PA, the front wheel turns 360 degrees, making it easy to turn the unit on turf or pavement.

Circle #266

MTD PRO

330/273-4550

www.mtdpro.com

The Pro F8 Tornado Blower from MTD, Cleveland, OH, generates 175 mph air speed and moves 2,500 cfm air volume. It's powered by an 8-hp Briggs & Stratton Industrial Plus.

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PARKER

630/627-6900

www.parkersweeper.com

The Scavenger all-terrain litter vacuum from Minuteman, International, Addison, IL, comes with a 5-

hp Briggs & Stratton or Honda engine to turn an all-steel impeller.

Circle #268

SHINDAIWA

503/692-3070

www.shindaiwa.com

The Powerbroom models PB230 and PB270 from Shindaiwa, Tualatin, OR, are recommended for cleaning up turf or removing sand, dirt or fallen fruit. Units are powered by a Shindaiwa-built premium two-cycle 22.5 or 27.5cc engine.

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www.sisis.com

Collect thatch or pick up debris with the Litamina sweeper/collector. It has easily adjusted brush with spiral design that drives refuse centrally into the hopper.

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ask the expert

BY BALAKRISHNA RAO, PH.D.

Yucky yucca

Two years ago I removed an overgrown and diseased Yucca plant from a flower bed, but it keeps growing back. On two different occasions I dug deep down to remove the thick, fibrous roots, but I guess I didn't get all of them out because the plant shot up out of the ground again after just a few weeks. Can you recommend a product that will kill the roots?

— IL

Consider using a systemic herbicide such as Roundup or a contact herbicide such as Finale on actively growing green plant tissue. Since the active ingredient may have difficulty penetrating into a succulent plant such as yucca, you may also want to consider Accord SP. This product contains the same active ingredient as Roundup with a proprietary surfactant that aids in penetration. Thorough coverage is important. Repeat treatments as needed. You could also dig as you have done before or use a stump grinder to destroy the roots.

Controlling oxalis

Our small lawn care company uses a dry fertilization program. For weed control, we want to spot treat with herbicides. Is there a pre-emergent herbicide that would help us control oxalis?

— IN

Oxalis is a weed that's difficult to manage. Spot treating oxalis with herbicides is difficult because it produces many seeds during the growing season which, when mature,

spread by bursting the seedpod. This process gradually spreads the weed plant outward from its mother plant. Even seeds that don't immediately grow into weed plants are a threat as they can remain viable in soil for 15 to 20 years. You'll need repeat applications of selected herbicide.

The success of spot treating hinges upon periodic inspection and treatment as needed by a professional lawn care operator. Consider using a pre-emergent herbicide such as Dimension, Pendimethalin or Gallery as the weeds germinate.

Recognize that weeds are opportune pests. They appear for a reason. Poor density and turfgrass health quality can open up weed establishment areas. Therefore, note lawns with a history of oxalis and consider treating with herbicides as needed in the spring.

Spruce tree trouble

A large number of spruce trees we planted in June 2000 did fine until winter, when some needles turned a pale color and others brown. We're afraid some of the trees may not survive. Any idea what may be the problem? Do you have any tips for helping them?

— MI

Based on your description, the problem appears to be related to transplant shock. Digging and transplanting causes trees to lose a large amount of functional absorbing roots, which leads to water and nutrient uptake problems. This can be further aggravated by too much or too little moisture, including flooding and/or drought. Absorbing roots are the mechanical

pumps, and if they're broken or diseased they become dysfunctional. This disruption and imbalance in water uptake results in plant tissues drying out, which can be made worse by wind and excessive evapotranspiration from exposed plant parts.

Remember that a transplanted plant such as a Christmas tree may look green for awhile, but that's only because it's using its reserve water and nutrients.

Make sure these plants aren't overfertilized, particularly with a water-soluble source of quick-release fertilizer. Improper fertilization with high salt index can burn some of the absorbing roots. Also, mulching too close to the trunk encourages rodent feeding activity and excessive moisture retention. Examine the roots for decay caused by root rot fungal disease.

Weird fungus

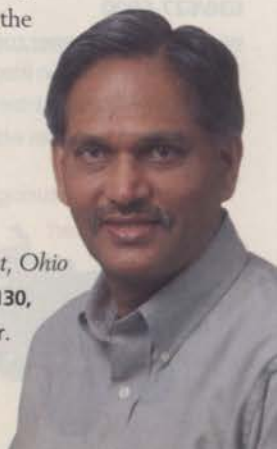
One of my customers has a weird fungus on his lawn that looks like small, white, fluffy tufts sitting among the grass blades. Any idea what this could be?

— PA

The problem appears to be related to a fungal disease called slime mold. This normally grows on grass blades and produces fruiting bodies as it matures. They don't cause too much harm to turfgrass. It is often more of an aesthetic problem. Sweeping and hosing with water will reduce the problem.

Manager of Research and Technical Development for the Davey Tree Expert Co., Kent, Ohio

SEND YOUR QUESTIONS TO: "Ask the Expert" Landscape Management; 7500 Old Oak Blvd.; Cleveland, OH 44130, or email: sgibson@advanstar.com. Please allow two to three months for an answer to appear.



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- 08 355 Extension Agents/Consultants for Horticulture
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2. Which of the following best describes your title? (fill in ONE only)

- 12 10 **Executive/Administrator** - President, Owner, Partner, Director, General Manager, Chairman of the Board, Purchasing Agent, Director of Physical Plant
- 13 20 **Manager/Superintendent** - Arborist, Architect, Landscape/Grounds Manager, Superintendent, Foreman, Supervisor
- 14 30 **Government Official** - Government Commissioner, Agent, Other Government Official
- 15 40 **Specialist** - Forester, Consultant, Agronomist, Pilot, Instructor, Researcher, Horticulturist, Certified Specialist
- 16 50 **Other Titled and Non-Titled Personnel** (please specify) _____

3. SERVICES PERFORMED (fill in ALL that apply)

- 17 A Mowing
- 18 B Turf Insect Control
- 19 C Tree Care
- 20 D Turf Aeration
- 21 E Irrigation Services
- 22 F Turf Fertilization
- 23 G Turf Disease Control
- 24 H Ornamental Care
- 25 I Landscape Design
- 26 J Turf Weed Control
- 27 K Paving, Deck & Patio Installation
- 28 L Pond/Lake Care
- 29 M Landscape Installation
- 30 N Snow Removal
- 31 O Other (please specify) _____

4a. Do you specify, purchase or influence the selection of landscape products?

58 Yes 59 No

4b. If yes, indicate which products you buy or specify: (fill in ALL that apply)

- 32 1 Aerators
- 33 2 Blowers
- 34 3 Chain Saws
- 35 4 Chipper-Shredders
- 36 5 De-icers
- 37 6 Fertilizers
- 38 7 Fungicides
- 39 8 Herbicides
- 40 9 Insecticides
- 41 10 Line Trimmers
- 42 11 Mowers
- 43 12 Snow Removal Equipment
- 44 13 Sprayers
- 45 14 Spreaders
- 46 15 Sweepers
- 47 16 Tractors
- 48 17 Truck Trailers/Attachments
- 49 18 Trucks
- 50 19 Turfseed
- 51 20 Utility Vehicles

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5A. If so, how often do you use it?

54 A Daily 55 B Weekly 56 C Monthly 57 D Occasionally

101	113	125	137	149	161	173	185	197	209	221	233	245	257	269	281	293	305
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110	122	134	146	158	170	182	194	206	218	230	242	254	266	278	290	302	314
111	123	135	147	159	171	183	195	207	219	231	243	255	267	279	291	303	315
112	124	136	148	160	172	184	196	208	220	232	244	256	268	280	292	304	316

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106	118	130	142	154	166	178	190	202	214	226	238	250	262	274	286	298	310
107	119	131	143	155	167	179	191	203	215	227	239	251	263	275	287	299	311
108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312
109	121	133	145	157	169	181	193	205	217	229	241	253	265	277	289	301	313
110	122	134	146	158	170	182	194	206	218	230	242	254	266	278	290	302	314
111	123	135	147	159	171	183	195	207	219	231	243	255	267	279	291	303	315
112	124	136	148	160	172	184	196	208	220	232	244	256	268	280	292	304	316

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