

# ROOM TO BREATHE

That's what aeration is all about. And to do it right, use hollow tines when the turf is active.

by Terry McIver, associate editor



Aerate cool season turf in early spring or early fall. Warm season grasses are best aerated in late spring.

**C**ore aeration remains the best single cure for the respiratory ills caused by the triple threat of soil compaction, thatch and inter-facing soils.

Proper and timely aerification as-

sure that the turf completes the season in a healthy soil base and can breathe easier. The effectiveness of fertilizers and pesticides is upgraded, and overseeding into established lawns can be done without destroying

existing grass.

"Aeration of the soil is an exchange of gases between the ground and the atmosphere," says Paul Rieke, Ph.D. at Michigan State University. "It's also a practice of cultivation that helps to improve the root system.

"The goal of aerating is to create a better environment, a favorable growing medium for seed and established turf."

#### Impact on compaction

In soil containing shallow layers of compacted or incompatible soils, coring reopens a channel between soil layers, removes a portion of the problem soil and permits top dressing and refilling with more compatible material.

"Core aeration is the best way to improve the soil's oxygen diffusion rate," says Robert Morris, area specialist in commercial horticulture at the University of Nevada.

Morris explains that soil normally consists of micro and macro pores. Micro pores contain water; diffusion occurs in the macro pores. "But when soil is compacted," says Morris, "the

## An analysis of solid tine aeration

Recent aeration research by Robert Carrow, Ph.D., University of Georgia, tends to support the belief that solid-tine coring is less effective as a turf cultivating procedure.

Carrow has been studying the effects different cultivation techniques have on surface compaction, root progression at varied depths and water extraction. Four aeration methods were studied: deep-drill coring, slicing, hollow-tine coring and shatter-core.

"Our soils in southern Georgia are high in clay content," explains Carrow. "Typically those soils are highly subject to surface compaction, and harden quickly when dry, making root progression difficult."

Carrow experimented on Tifway Bermudagrass, one of the most common grasses for use on recreational fields. Tifway is one of the most tolerant grasses when it comes to compaction, so Carrow believed the results would be very evident.

These were the general results:

In the 8- to 24-inch zone, the Aerway slicer enhanced rooting from 53 to 120 percent; the deep drill, 31 to 55 percent; hollow tine, 20-35 percent. The solid tines did not improve deep rooting within the 8- to 24-inch zone, but the solid tine sample tended to have higher roots in the 4- to 8-inch zone.

Carrow next tested for water extraction (how much

water the roots extract from the zone) during a dry-down period, from 0 to 24 inches.

"The deep drill, Aerway slicer and hollow tine aerator all improved water extraction, but the solid tine did not," says Carrow. We see the plant extracting more water from deeper in soil where there are more favorable water relations."

Carrow's findings should apply to a variety of turf. "Remember, our red clay soil has more than the usual amount of surface compaction."

—Terry McIver □



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macro pores are destroyed, and all that remains are water-laden micro pores. Since water is extremely dense, air takes approximately 100 times longer to diffuse through the micro pores. The more porous the soil, the greater the likelihood of a healthy root system."

**When thatch attacks**

Thatch accumulation presents a variety of cultivation problems. In addition to providing a home for insects, it becomes a temporary but poor growing medium for new seed, resulting

ultimately in a poorly rooted generation of new grass.

**Combating soil interface**

Interfacing occurs when soils with unlike physical properties collide, obstructing water flow.

Doug Chapman, horticulturist for Dow Gardens, Midland Mich., says interfacing also affects the depth of the root system, and indicates layering.

"An interface develops between either the native soil type, sandy ground and topdressing, or, if thatch is

present, between the ambient soil, thatch layer and top dressing material," explains Chapman, who presents a scenario in which one problem leads to another:

"Let's say you have thatch covered by a layer of sand. The thatch will have a broken column, and capillarity will not occur. All moisture and root growth stops at that layer.

"If you have sandy soil contrasted with richer soil, or if you top dress with complete soil, the roots might

**CORING AERATORS**

COMPANY AND PRODUCT MODEL	TINE TYPE	TINE DIMENSIONS/WIDTH IN INCHES	PENETRATION DEPTH IN INCHES	TINE SPACING IN INCHES	TYPE OF MACHINE (TOW OR WALK)	SPEED OF OPERATION	MACHINE WIDTH IN INCHES	WEIGHT IN LBS.	SUGG. RETAIL PRICE	COMMENTS
<b>BRINLY-HARDY CO.</b> CA-360	Spoon	6.25 x .93	2	6	Tow	2-6 MPH	41.75	84	185.00	
<b>CLASSEN MFG. INC.</b> Model 800-24	Open-closed	½ MIB, ¾ OD ¾ OD	03-¾	Variable 1 x 2 to 5 x 2	Tow	0-250 FPM	49	750	5925.00	
Model 450	Open-closed	¼, ¾, ½ & ¾	0-3	2 x 2	Walk	100 FPM	32	450	3900.00	
Model 500ATC	Open-closed	¾ OD	0-3	6 x 3	Walk	200 FPM	28½	310	2785.00	
Model 500	Open-closed	¾ OD	0-3	6 x 3	Walk	200 FPM	28½	300	2360.00	
Model 600	Open-closed	¾ OD	0-3	6 x 6	Walk	200 FPM	35½	300	2360.00	
Model 400	Open-closed	¾ OD	0-3	6 x 6	Walk	200 FPM	22½	250	1795.00	
Model 36R	Open-closed	¾ OD	0-3	4 x 7	Walk	225 FPM	28½	340	1550.00	
Model 48R	Open-closed	¾ OD	0-3	5¼ x 7	Tow	Tractor	42	225	995.00	
<b>CUSHMAN - RYAN</b> Lawnaire 28	Hollow	¾ x 4¼	2½	3½ x 5	Walk	24,000 FPH	34	400	3500.00	
Lawnaire IV	Hollow	¾ x 7½	0-22¾	3¾ x 7	Walk	21,000 FPH	28	215	1560.00	
Lawnaire 3 pt	Hollow	¾ x 7½	0-4	6 x 6	Tow	0-10 MPH	46	500	1270.00	
<b>DEDOES IND.</b> Model A Trailer	Hollow	¾, ½, ¾ dia.	2½-3½	2½ x 2½	Tow	0-10 MPH	60	600-800	5334.00	Available in 2-3 drum units
Model H	Hollow	¾, ½, ¾ dia.	2½-3½	2½ x 2½ 4 x 4	3 Pt. Tow	0-10 MPH	72	500	3321.00	Available in 2-3 drum units
Model B Trailer	Hollow	¾, ½, ¾ dia.	2½-3½	2½ x 2½ 4 x 4	Tow	0-8 MPH	57	400	3067.00	Available in 2, 3, 4 drum units
Model L Disk	Hollow; Taper/open	¾ x 3	3	6 x 6	Tow	0-10 MPH	72	410	2339.00	Available in 5-7 disk units
Model K Disk	Hollow	¾ x 3	3	6 x 6	3 Pt. Tow	0-10 MPH	42	320	1954.00	Available in 5-7 disk units

not grow well, and you may have to water more frequently. If it happens to be a thatch interface, it might dry out and then you have to re-wet it. If it gets completely dry, you can't re-wet it without a detergent or surfactant or other wetting agent."

### Aerate when it's active

Experts agree that aeration must be practiced only when the turf is active and able to bounce back from treatment.

*Carrow at Georgia suggests that commercial turf might require more attention after coring.*

"If you aerify too soon," warns Chapman, "the root systems are disturbed, and fill-in may not occur."

"If you core in early spring and don't have strong grass or turf activity, it won't start filling in until after weed season starts, which by then is too late."

"The question of when to aerate is related to the spring root die-back phenomenon," says Robert Shearman, Ph.D. at the University of Nebraska.

"When the plant initiates top

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<b>JOHN DEERE CO.</b>										
Model 270	Open-closed	½ x 8½; ¾ x 8½	1¼	5½ x 4	3 Pt. Tow	7.5 MPH	74	680	2872.00	
Model 132	Open-closed	½ x 8½; ¾ x 8½	1¼	5½ x 4	Tow	7.5 MPH	34.5	540	1543.00	
Model 232	Open-closed	½ x 8½; ¾ x 8½	1¼	5½ x 4	3 Pt. Tow	7.5 MPH	34¼	500	1212.00	
<b>FELDMANN ENGINEERING CO., INC.</b>										
2340-48	Spoons	4¾ x ¾	2½	9 holes per sq. ft.	Tow	Varies	48	118	409.50	
2340-32	Spoons	4¾ x ¾	2½	9 holes per sq. ft.	Tow	Varies	32	85	309.50	
<b>GANDY CO.</b>	Welded spikes	2½ dia.	1¼	6 Ctr	Hitch	N/A	24	350	N/A	
<b>GREEN CARE INT'L.</b>										
CoreMaster 12	Hollow	¼, ½, ¾, ¾	0-3¼	1 x 1¼, 1 x 2, 2 x 1, 2 x 2, 2 x 3, 2 x 5	Tow	Up to 30,000 FPH	48	800	8495.00	
<b>HAHN, INC.</b>										
TMV	Open-closed	8½ x ¾	9-3½	5 x 7	Ride	0-4½ MPH	33	700	4300.00	
TB-140	Open-closed	8½ x 1	0-3½	5 x 7	Tow	0-10 MPH	90	954	3970.00	
TM-140	Open-closed	8½ x 1	0-3½	5 x 7	Tow	0-10 MPH	74	675	2995.00	
TB-60	Open-closed	8½ x 1	0-3½	5 x 7	Tow	0-10 MPH	34	550	1645.00	
TM-60	Open-closed	8½ x 1	0-3½	5 x 7	Tow	0-10 MPH	34	500	1310.00	
EA-3	Open	7 x ½	0-3	5 x 7	Walk	0-3 MPH	25	166	895.00	

it does so at the expense of the root system. Carbohydrates in the root system move toward the topgrowth, resulting in some slowing, and possible dieback of root growth. Once topgrowth reaches equilibrium, it starts to regenerate itself."

The aeration timetable differs according to turf type. Cool-season turf is best aerated in early spring and early fall, when the grass is growing vigorously and has ample time to recover from the aeration before dry weather or frost.

Chapman suggests aerating Northern grasses in late August through

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September. "If you're spreading pre-emergence herbicides, and doing a lot of other things to prepare the turf, you can justify aerating in early spring," assures Chapman. "However, commercial landscape, in which the grass grows from 2½ to 3 inches, is a different situation."

Warm-season turf should be aerated during the late spring and early summer.

Frequency of aeration depends on the landscape, volume of traffic and type of soil. Says Chapman. "If the turf receives moderate traffic, and you have sandy soil, once a year is suffi-

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<b>JACOBSEN</b>										
590	Slicing	4-6	4-6	7 Ctr	Tow	0-10 MPH	72	1240	2729.00	
590	Open	½-¾	4-6	7 Ctr	Tow	0-10 MPH	72	1240	2729.00	
590	Closed	½-¾	4-6	7 Ctr	Tow	0-10 MPH	72	1240	2729.00	
595	Slicing	4-6	4-6	7 Ctr	Tow	0-10 MPH	48	1018	1989.00	
595	Open	½-¾	4-6	7 Ctr	Tow	0-10 MPH	48	1018	1989.00	
595	Closed	½-¾	4-6	7 Ctr	Tow	0-10 MPH	48	1018	1989.00	
<b>LESCO</b>										
Aerator - 30	Open-closed	6 x ¾	2-4	5½ Ctr	Walk	2.5 MPH	30	254	965.00	
<b>OLATHE</b>										
88	Closed	7¾ x ¾	0-3	3¾-9½	Walk	3½ MPH	32.5	295	1450.00	
<b>SALSCO</b>										
FTA-60-24	Hollow	¼-¾	4	2¼ x 2¼	Tow	Varies	84	1200	10,838.00	Seven tine sizes are available
30-12	Hollow	¼-¾	4	2¼ x 2¼	Walk	1 MPH	30	300	5064.00	Seven tine sizes are available
30-65	Hollow	¼-¾	4	2¼ x 4½	Walk	2½ MPH	30	300	4304.00	Seven tine sizes are available
30-6	Hollow	¼-¾	2¾	4½	Walk	2½ MPH	30	300	3531.00	Seven tine sizes are available
<b>SNAPPER CO.</b>										
PP-5000	Open-closed	¾ OD 9/16 ID	0-2	4 x 7	Walk	17,200 FPH	16	175	1195.00	

cient. "If traffic volume is high, or if the soil is heavier than most, it might be desirable to aerate more often."

### Spoon/tine controversy

Hollow core aeration is done either with spoon-like tines or straight, hollow tines. Most professionals in sports and recreational turf prefer hollow tines, citing less surface damage as the reason. Shearman says the effects of hollow tine aeration are longer lasting.

"Spoonings tends to be shorter lived," he says, "because the divot can fit back into the location from which it was removed and be compacted down."

Shearman feels spoon aeration is used by those who want to spend less time and energy, as a spoon type aerator covers more ground in less time.

"We on the commercial scene prefer spoons," says Chapman. "Soil is better able to be redistributed once it's brought to the surface. The spoon



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removes the core, and distributes it over the turf."

Is there a distinction to be made between golf course and commercial aerating? Shearman says the basic precepts of the two methods are similar.

"You're shooting for the same end result," he says. "Control of compaction and soil interface, management of thatch buildup, layering and enhanced water flow."

But Robert Carrow, Ph.D. at the University of Georgia, suggests that commercial turf might require more attention after coring.

"Golf course superintendents usually apply supplemental fertilization before or after coring in order to get rapid recovery," reminds Carrow, "so you don't see much surface deterioration. But in a lawn care situation, the routine fertilization is not sufficient to promote rapid recovery. Applying a half-pound of nitrogen right after coring will guard against excess damage in commercial situations." **LM**

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<b>TERRACARE PRODUCTS, INC.</b>										
Terra 320	Open-closed	½ x 3¾; ⅝ x 3¾	2¾	3½ x 4¼	Tow	3 APH	60	1450	7000.00	
Terra 200	Open-closed	½ x 3¾; ⅝ x 3¾	2¾	3½ x 4¼	Tow	1½ APH	36	1060	5000.00	
Walk-R-ide	Open-closed	¼ x 3¾; ⅝ x 3¾	2¾	3½ x 4¼	Walk or Ride	¾ APH	18	600	3000.00	
Terra 98	Open-closed	½ x 3¾; ⅝ x 3¾	2¾	3½ x 4¼	Tow	1 APH	22	500	2000.00	
<b>TORO CO.</b>										
Fairway aerator	Hollow	¾ x ¾	3-5	5.3 x 6; 3½ x 3	Tow	2.2 MPH	63	2600	19,400.00	New for Spring 1989
Greens Aerator	Hollow	¾-¾	0-3	2¼ x 2½	Walk	1.1 MPH	27	1275	9325.00	
686	Open, closed, slice	½ x 4	N/A	6 x 6	Tow	0-10 MPH	78	1420	3400.00	
687	Open, closed, slice	½ x 4	N/A	6 x 6	3 Pt Tow	0-10 MPH	78	1290	2634.00	
96	Open, closed, slice	½ x 4	N/A	6 x 6	3 Pt. Tow	0-10 MPH	42	600	1620.00	