

Aerate for safe athletic fields

For the highest quality results, use a combination of aeration options.

by W. R. (Bill) Chestnut

■ Sports turf managers' number one goal is to provide athletes with safe, playable surfaces. While operating with limited budgets within tight time schedules. This not only requires constant monitoring of turf conditions and evaluation of plant needs, but also selecting the best combination of treatments and timing to produce and maintain vigorous turf.

Why aerate?—Compaction reduces the soil's ability to absorb oxygen and exhale carbon dioxide. Water penetration and drainage are slowed, affecting the turf's moisture supply. Root growth becomes stunted, resulting in weaker plants which are more susceptible to insects, diseases, temperature extremes and other stresses. Dying plants add to the thatch layer, further impeding the movement of oxygen, water and nutrients.

Soils may also exhibit sub-surface or deep compaction, similar to the hardpan condition found in agricultural soils. This condition may be the result of frequent shallow aeration to the same depth, of layering different textured soil media, or of a combination of these factors.

Since turf roots can't penetrate the deep compaction zone, root growth becomes concentrated in the top few inches of soil. Weaker plants die, further adding to the thatch layer.

Chemical applications, may escape as runoff or become trapped in the thatch layer.

Individual fields and sections of fields react differently due to their soil profile, the amount of activity they have sustained, the conditions under which activity occurred, and the maintenance they have received.

Symptoms of compaction may appear as hard soil; thinning or dying turf; slow water absorption, water runoff, or standing water; poor or shallow root growth; or specific areas quickly showing the effects of stress.

After observing field conditions, pull deep plugs of soil from scattered sections

to check the thatch layer, depth and pattern of root growth, and soil layering. A more precise reading of compaction can be taken with a penetrometer, a device that measures the resistance of an object to movement through the soil.

Options available—*Hollow-tine* or *core-type* aerators pull out plugs of soil which are deposited

on the soil surface. Plug diameters vary from 1/4 inch with quadra-tines to 3/4 inch with closed spoons. Plug length ranges from 1/2 to 3 inches. Cores must be removed or dragged back into the soil. Micro-organisms contained in the core soil help break down thatch.

With deep-tine aerators, soil cores of 6 to 16 inches can be pulled.

Because of the openings created by core-type aerators, it's possible to amend the soil profile with topdressing. Since different textured soils absorb water and nutrients at varying rates, choose topdressing materials compatible with the existing soil.

Core aeration should be scheduled according to play and practice needs. Since it severs turf roots and stolons, it should take place during periods of active growth for most rapid rejuvenation.

Spoon-type aerators, which open up the soil by lateral prying, cause slight disturbances at the point of exit. Open spoon-type aerators may pull soil to the surface.

Spike aerators also have lateral prying. They punch holes in the soil, but remove no soil core. These aerators offer a wide range of spike diameters and lengths.

Slice aerators use star-shaped blades, 4 to 6 inches in length. They cut into the turf, creating narrow openings.

The tines of the *shatter* aerator reach as deeply as 6-1/2 inches into the soil.

Use *shatter* aeration to penetrate hardpan barriers. Locate underground lines and

TYPES OF AERATION

Type	Disruption	When to schedule
spoon	slight	no parameters specified
core	heaviest	during active turf growth
slice	slight	overseeding; short time
lines	spike	varied when core is impractical
shatter	slight	for hardpan situations
water	none	for deep aeration

BENEFITS OF AERATION

- opens up the soil for air movement
- "softer" soil
- increased water capacity
- longer, stronger turf roots
- more vigorous top growth
- reduced thatch layer
- fewer, lesser amounts of herbicides and pesticides needed

cables to prevent damage.

Short-term relief of compaction can be achieved with a 12- to 20-inch high-pressure *water injection*. This method also works to treat hydrophobic conditions (inability to absorb water).

Avoid aeration when the soil is overly wet or dry, or when hot, windy days would expose grass roots to drying.

Many types of aeration equipment offer options in the size and spacing of tines. The speed at which equipment can be operated, as well as the number of passes needed to achieve the desired results, must be considered.

Not without problems—Weed seeds and disease organisms may be brought to the soil surface. Openings may allow increased insect activity. Herbicide treatments may be disrupted. Repeated aeration to the same depth may increase sub-surface compaction.

For best results, use a combination of aeration options throughout the year, adjusting treatments to match turf problems, growth cycles and field use. Since equipment and labor hours are limited, extend aeration benefits by selective use. For example, aerate clay areas more frequently than sand-based sections, and heavily used portions of a field more frequently than the entire field.

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