



Hollow tines can be used for both conventional and deep aeration.



Large aerators have made cultivation of sports fields more practical and effective. Photo courtesy: Cushman/Ransomes.

Cores brought up during aeration are an excellent topdressing.



Autumn Aeration Tips: Keeping Ahead of Compaction

By Mary Owen

Sports turf managers are in arguably the busiest time of year for activities on athletic fields, especially those in municipalities. Intense schedules mean heavy play and ultimately some degree of soil compaction. Plans should be formulated now for correction later, and in extreme instances of compaction, measures should be taken now to remedy the situation.

As soils become more compacted because of wear of the turf and traffic, the overall quality and vigor or the sward deteriorates. There is less tillering and less rhizome development, therefore the grass cannot recover and remain dense. The resiliency, the shock absorb-

ing capacity of the turf, is reduced. Player injuries can increase in frequency and severity.

Roots are physically unable to penetrate as deeply as in aerated, friable soil. Not only is water and nutrient uptake reduced, but so is anchorage. There is less leaf growth. Plants are unable to utilize nitrogen as efficiently as those growing in well-aerated soils. In fact, when high nitrogen applications are made to turf growing in compacted soils, which is often done as a means of compensating for less vigorous growth, rooting is even further restricted.

Core aeration provides a better environment for turfgrass growth by increasing the infiltration of water and air into the soil. Oxygen, which is taken up by

plant roots and is critical to respiration, becomes more available to plants. The result is an increased ability of the plant to do work needed for metabolism, to grow new leaves, to put out new tillers and rhizomes, and to increase the volume and depth of roots.

Compacted soils have increased bulk density. Bulk density is a measure of the weight of a specific volume of soil. The more soil material in a given volume, the greater the weight, the higher the bulk density, and the more compacted the soil. As soil becomes compacted, the amount of pore space, the empty space that is capable of holding water or air, is decreased. These spaces also provide the pliancy of the soil, which allows for physical ease of root penetration.

More heat is required to raise the temperature of compacted soils, especially those which tend to be heavy and wet. These types of soils will stay cooler longer in spring and can be the cause of delay in turfgrass seed germination as well as a contributor to poor control of annual grassy weeds.

The relief of compaction increases not only the infiltration of air, but also the percolation of water into the soil. There is a reduction in puddling and potential for runoff. There is less likelihood of ice buildup and damage such as occurred during the winter of '93-'94 on many fields in New England.

On the other hand, core aeration performed too late in the season, especially with core holes left open, might increase the likelihood of root damage caused by desiccation should the ensuing winter prove to be an open and deeply cold one.

Deep-tine cultivation, such as is done with the VertiDrain, can remedy surface as well as subsurface compaction. As the solid-blade tines penetrate the soil, they do not force the soil downward. Instead, half of the soil touching the tine is moved ahead of the tine, and half is moved behind. As the tine is raised and the machine moves forward, soil is literally pulled upward alongside the cultivation hole. The result is a greatly loosened rootzone with the soil and turf surface actually being raised. The tines are followed by a roller which helps to smooth out the surface.

Deep-tine aeration is being used successfully on athletic fields and in other areas where repeated surface-core or solid-tine aeration has created a compacted layer, where rootzone and/or underlying conditions are poor, where water infiltration is severely restricted, or where traffic has been intense with little correction over time.

Aeration provides an excellent opportunity for subsequent slice seeding, topdressing and other practices. Topdress with a material appropriate for the soil present or alternatively by dragging the cores and thus shattering the soil present back down into the aeration holes.

Soil should be moistened before aeration, so that less friction is produced at the soil/tine interface and tine penetration will be most efficient.

While autumn, at the conclusion of the fall sports season, is an excellent time to aerate, there are several other times when aeration would be beneficial,

depending on the scheduled use of the fields involved. They are spring, just prior to overseeding; later spring, just after the spring sports season; and early fall, prior to the fall sports season.

Aeration should otherwise be performed whenever conditions warrant. Avoid the hottest times of the summer months, as the physical disruption might only compound the stress of heat, humidity and high soil temperatures on cool-season turfgrasses. If compaction must be relieved during stressful times, choose

smaller diameter tines and irrigate immediately after to reduce stress levels.

Aeration is one of the most important cultural practices you can perform to positively influence overall plant health, soil condition, and turf quality. Make sure it is on your "To Do" list. □

Editor's Note: Mary Owen is regional turf specialist with the University of Massachusetts Cooperative Extension System.

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