

LAWN AERATION

Removing small cores of soil from your lawn reduces soil compaction and promotes root growth for healthier grass!

What Is Aeration?

Technically speaking, aeration is the naturally occurring process of air exchange between the soil and its surrounding atmosphere. Practically speaking, aeration is the process of mechanically removing small plugs of thatch from the lawn to improve soil aeration. Textbooks of ten refer to the practices of soil aeration as soil cultivation (coring, spiking and slicing). The aeration process is also commonly called core aeration in the lawn service industry, and home owners often refer to it as aeration.

What are the benefits of aeration?

Core aeration helps the lawn's health and vigor, and it reduces maintenance requirements. The following are other benefits of core aeration.

- Improved air exchange between the soil and atmosphere.
- Enhanced soil water uptake.
- Improved fertilizer uptake and use.
- Reduced water runoff and puddling.
- Improved turf grass rooting.
- Reduced soil compaction.
- Enhanced heat and drought stress tolerance.
- Improved resiliency and cushioning.
- Enhanced thatch breakdown.

The type of aeration equipment used influences the benefits obtained from aeration. Equipment with hollow tines removes soil cores. Equipment with open tines divots the soil surface. Aeration equipment varies in tine size up to 3/4 inch and in depth of penetration up to 3 inches, depending on the manufacturer's specifications

Penetration depends on soil type, soil moisture, tine diameter, and the weight and power of the aerator. For example, tines penetrate sandy soils easier than they penetrate heavy clay soils, and penetration is better in moist soils than dry soils. In general, turf responds best when core holes are close and deep.

A 3/4-in. aeration tine with 6-in. spacing and a penetrating depth of 3 inches removes about 1.2 percent of the soil's volume in that 3-in. profile. The closer the tine placement removes more soil, exposes more soil surface area for water and fertilizer uptake, and it alleviates compaction quicker than the wider tine spacing.

Why is aeration necessary?

In most home lawns, the natural soil has been seriously disturbed by the building process. Fertile topsoil may have been removed or buried during excavation of the basement or footings, leaving subsoil that is more compact, higher in clay content and less desirable for healthy lawn growth. These lawns need aeration to improve the depth and extent of turfgrass rooting and to improve fertilizer and water use.

Intensively used lawns are exposed to stress from traffic injury. Walking playing and mowing are forms of traffic that compact soil and stress lawns. Raindrops and irrigation increase soil density by compacting soil particles and reducing large air spaces where roots may readily grow.

Compaction is greater on heavy clay soils than on sandy soil, and it is greatest in upper 1 to 1-1/2 inches of soil. Aeration helps heavily used lawns and lawns growing on compacted soils improving the depth and extent of turfgrass rooting, allowing better water uptake, enhancing fertilizer use, and speeding up thatch breakdown.

Most home lawns are subject to thatch accumulation. If thatch is left unmanaged, it can lead to serious maintenance and pest problems. For example, thatch accumulation of more than 1/2 inch on Kentucky bluegrass lawns impedes water, fertilizer and pesticide effectiveness. Core aeration reduces thatch accumulation, minimizes its buildup and modifies its makeup by incorporating soil into the thatch. As soil is combined with the thatch debris, soil organisms are better able to break down the thatch and reduce its accumulation.

Thatch accumulates faster on compacted soils, heavy clay soils and subsoils that are disturbed during building processes than on well-aerated soils. Therefore, lawns require frequent aeration to prevent thatch buildup. Most home lawns growing on heavy clay or highly compacted soils require annual aeration to restrict thatch accumulation.



THATCH BREAKDOWN - Core aeration modifies thatch by incorporating soil into it. This allows soil organisms to break down the thatch and reduce its accumulation. Turfgrass rooting and surface growth also improve after aeration.

When should lawns be aerated?

Annual aeration is beneficial for most lawns. Lawns growing on heavy clay or subsoils, and lawns exposed to intense use benefit from more than one aeration each year. In general, benefits increase when the tine spacing is closer and penetration is deeper. Most turfgrasses respond favorably to aeration when it is properly timed.

Both spring and fall are ideal times to aerate cool season turfgrass such as Kentucky bluegrass and perennial ryegrass. In most cases, spring aeration is performed between March and May, depending on the locations, turfgrass species and intensity of use. Fall aeration is done late summer and early fall, usually between August and November. Aeration before or at the time of late season fertilization enhances root growth responses and improves spring greenup and growth.

It is best to aerate warm season turfgrasses such as zoysiagrass and bermudagrass in mid-spring to summer. Avoid aerating when warm season grasses are dormant. This may encourage cool season weed competition. In addition, avoid aerating warm season grasses during spring greenup. It is best not to aerate warm season lawns until after they have received their first mowing in spring.

Although aeration is beneficial for lawns, it can also open up spaces for weeds such as crabgrass and annual bluegrass to invade the lawn. It is best to aerate before you apply pre-emergence herbicides, rather than after. Aerating after a herbicide application can reduce the

chemical barrier formed by the herbicide, thereby allowing some weeds to germinate and grow in the lawn. Applying fertilizer after the aeration helps the lawn compete against weeds. Water the lawn after aeration, particularly in the areas where drought and high temperatures are common.

What can you expect?

Immediately after aeration, your lawn will be dotted with small plugs pulled from the soil. Within a week or two, these small plugs of thatch and soil break apart and disappear into the lawn.

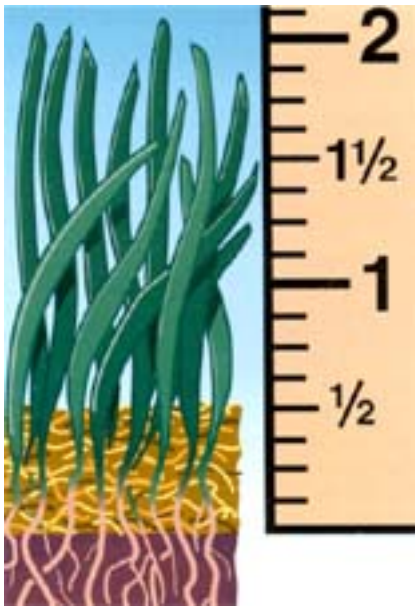
About 7 to 10 days after aeration, the aerification holes will be filled with white, actively growing roots. These roots are a sign that the turfgrass is responding to additional oxygen, moisture and nutrients in the soil from the aeration process.

On compacted soils and on lawns with slopes, you should see an immediate difference in water puddling and runoff after irrigation or rainfall. After aeration, your lawn should be able to go longer between waterings, without showing signs of wilt. With repeat aerations over time, your lawn will show enhanced heat and drought stress tolerance.

Don't expect miracles from a single aeration, particularly on lawns growing on extremely poor soils. Most lawns benefit from annual aeration. Lawns that receive this care will be healthier, more vigorous, easier to maintain and have fewer pest problems than lawns that are neglected.



SOIL COMPACTION - Turfgrass in compacted soil (left) grows slowly, lacks vigor and becomes thin or does not grow at all. Core aeration (center) removes small cores of soil, depositing them on the surface of the turf. This improves the depth and extent of turfgrass rooting (right), and it can help save money on your water bill.



THATCH BUILDUP - Although a thin layer of thatch is beneficial, thatch accumulations should not exceed 1/2 inch. Excess thatch blocks out air, light and water from reaching root zones. Core aeration reduces thatch accumulation and minimizes its buildup.

Useful Definitions

COMPACTION: A condition that occurs primarily in the upper 1 to 1-1/2 inches of soil. Compacted soils have reduced air spaces and more resistance to root growth than non-compacted soils. Compacted soils are dense and cause water to puddle and run off.

CORE AERATION: The mechanical removal of small cores of soil and thatch from the lawn.

DETHATCHING: The process of removing the thatch layer from turf. This process is usually done mechanically with a dethatching unit or power rake.

POWER RAKE: Turf equipment that mechanically removes thatch with rigid wire tines or steel blades, which slice through the turf and lift the thatch debris to the surface for removal.

THATCH: The layer of dead and decaying plant tissue located between the soil surface and the green vegetation. A thin layer of thatch is beneficial because it reduces soil compaction and it increases wear tolerance. However, a thatch layer of 1/2 inch or more prevents air, light and water from reaching the turf's root zone. Thatch also makes an excellent breeding ground for harmful insects and disease organisms.

Technical credit: This brochure was written by Dr. Robert Shearman, turfgrass professor at the University of Nebraska, Lincoln, NE.

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