

Thatch and Its Control in Florida Lawns¹

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Thatch is defined as an intermingled layer of dead and living shoots, stems, and roots that develops between the zone of green vegetation and the soil surface. Thatch consists of a loosely interwoven collection of plant matter that leaves the turf feeling spongy or puffy (Figure 1). When excessive (1 inch or more), thatch causes serious problems in Florida lawns.



Figure 1. Soil Core Showing Thatch Build-Up Above the Soil Line.

Why is Thatch a Problem?

Thatch accumulations are undesirable for a variety of reasons.

- ***Thatch can restrict water and air movement into the soil.*** Dry thatch tends to repel water rather than allow infiltration, and wet thatch enhances disease problems. If your lawn has dry spots that are difficult to rewet (unless you almost flood the areas), these are probably dry thatch spots.

- ***Thick thatch makes mowing very difficult.*** As thatch builds up, mowing height actually increases above the soil line, and the turf becomes very spongy, allowing the mower to sink into the turf and scalp the lawn. This results in an uneven appearance and often a mottled brown and green surface.

- ***Thatch provides an ideal habitat for insects and disease.*** Thatch accumulation is associated with an increased incidence of many insects and diseases.

- ***A thatchy condition elevates the growing points (crowns), runners (rhizomes and stolons) and roots above the soil surface.*** As a result, the lawn is prone to damage from mowing too low and from environmental stresses such as winter injury because elevated plant parts are exposed to greater extremes in temperature. Centipedegrass is especially sensitive to winter kill because the stolons are elevated and are

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more prone to cold temperatures in thatchy lawns. Heavily thatched lawns also go dormant following the first exposure to cold weather, and green-up more slowly in spring.

• ***Thatch can interrupt and restrict the downward movement of pesticides and fertilizers into soil.*** This reduces the effectiveness of these materials, making pest control difficult and producing a nonuniform, erratic response to fertilization.



Figure 2. Brown Patch: Certain diseases are more likely to prevail in thatchy lawns. It is also harder for chemicals to penetrate through thatch, making them less effective.



Figure 3. Sod Webworm: Many insects also favor thatch.

Causes of Thatch Buildup

Thatch is basically a residue problem that occurs in most turfgrasses. Thatch buildup has been attributed to numerous factors. Excessive plant growth (when vegetative production exceeds decay) results in the accumulation of thatch. Grasses depend upon constant regeneration for survival, and new growth of creeping grasses covers the old, causing residue accumulation.

St. Augustinegrass, hybrid bermudagrass, seashore paspalum, and zoysiagrass often accumulate excessive thatch. Likewise, improper management practices such as overfertilizing, overwatering, and infrequent mowing often increase thatch buildup. In addition, failure to keep the soil environment

favorable for bacterial and fungal growth—by pH control, adequate irrigation, and aeration—decreases the rate of decomposition of thatch residues, because these organisms are responsible for decay of organic matter. Failure to remove clippings after mowing has been cited as a cause of thatch buildup, but research findings do not support this concept. If properly mowed, leaf clippings decompose readily and *do not* contribute to thatch.

Thatch Control

Effective control of thatch requires a combination of several management practices. These include reducing plant growth and increasing microbial decomposition, and periodically removing thatch by scalping and/or vertical mowing.

Cultural Practices

Excessive fertilizer and irrigation are two of the primary causes in thatch buildup over time. Fertilizer should be applied as necessary to maintain reasonable growth and density. This will minimize weed invasion. Excessive succulent growth caused by overfertilization increases thatch, increases susceptibility to pests, and reduces the turf's overall tolerance to environmental stresses. Mowing practices can help control thatch buildup. Lawns should always be mowed at the recommended height and frequency. Thatch seldom increases if no more than 1/3 of the leaf blade is removed at each mowing.

Liming of acid soils may help increase decomposition of thatch residues and thus retard buildup. A soil pH of 7.0 is ideal for maximum microbial activity and decomposition.

Mechanical Thatch Removal

Scalping

Close mowing or scalping is a procedure where the turf is mowed to a much shorter height than normal in an attempt to remove thatch. *We do not advise homeowners to attempt this without consulting a turfgrass professional or your county extension agent.* Damage done to the lawn from scalping may kill St. Augustinegrass or centipedegrass and can severely injure other turf species.

Vertical Mowing

The most common method of mechanical thatch removal is the use of a heavy-duty vertical mower. This specialized piece of equipment has evenly spaced, knife-like blades, revolving perpendicularly to the turf, that slice into the thatch to mechanically remove it (Figure 2). This process removes both thatch and mat and simultaneously cultivates the soil and topdresses the turf. It is very important to use proper blade spacing when vertically mowing different turfgrasses. Use a blade spacing of one to two inches for bermudagrass and zoysiagrass, two to three inches for centipedegrass and three inches for bahiagrass and St. Augustinegrass. Because of their underground rhizomes, zoysiagrass, bermudagrass and bahiagrass may be vertically mowed down to soil level in several directions without killing the lawn. If all of the aboveground stolons are removed from centipedegrass and St. Augustinegrass, these turfgrasses may die. If thatch accumulation exceeds two to three inches, lawns should be vertically mowed carefully more than once, but the lawns should be allowed to fully recover between mowings.



Figure 4. Verticutting Removes Thatch by Slicing Through Plant Tissue

Vertical mowing is an effective means of removing thatch, but if not done properly, the grass can be so severely damaged that it may not survive. Experience with the method and equipment and knowledge of the type of grass being renovated are essential. In many cases it may be advantageous to have a reputable commercial lawn maintenance company remove thatch.

Thatch removal should be considered necessary when thatch thickness exceeds one inch. Frequency of that removal will vary, depending on intensity of management. The best time to vertically mow grasses

south of Orlando is March through August; for grasses north of Orlando, the best time is April through July. Vertical mowing at these times ensures quick recovery since warm-season grasses grow rapidly during these periods.

After dethatching, cleanup is necessary. Thatch removed from an average sized lawn may fill several pickup trucks. This debris must be raked, swept or vacuumed, and removed from the lawn. Following cleanup, the lawn should be conventionally mowed closely to remove further debris. The lawn should then be thoroughly watered (e.g. 3/4 inch of water) to prevent drying of exposed roots. Approximately one week following dethatching, nitrogen fertilizer should be applied to encourage turf recovery. Apply 1/2 - 1 pound of actual nitrogen per 1000 square feet in a quick-release soluble form (e.g., ammonium nitrate or ammonium sulfate). Be sure to irrigate after nitrogen application to minimize turf burn. This type of renovation places the turf under a considerable amount of stress, so it is important to minimize any other stresses. Do not subject the grass to traffic, over- or under-watering, or chemical applications until normal growth has resumed.



Figure 5. Following Verticutting, Grass Can Be Severely Stressed, but Will Regrow if the Verticutting was Done Correctly.

Power Raking

This specialized machine uses evenly spaced, flexible, spring steel tines that revolve at high speeds to strip through turf and loosen debris for subsequent removal. The machine and procedures are often confused with vertical mowing. Power raking does not involve a cutting action, as does vertical mowing. Therefore, it is not a substitute for vertical mowing and thatch removal, but is used most often to remove a mat layer.

Cultivation and Soil Topspreading

Periodic cultivation by coring (aerification) and soil topdressing (application of soil to the turf surface) are standard maintenance procedures for control of thatch on highly managed turf areas. Mechanical cultivation removes small plugs of thatch and soil, thus leaving small holes in the soil that allow penetration by air, water, fertilizers, and pesticides. It also hastens decomposition by providing a more favorable environment for microbial activity. Coring does not remove substantial amounts of thatch, but it provides a more favorable environment for microbial activity, improves drainage in some soils, and provides increased oxygen to the roots.

Topdressing increases decomposition by bringing soil microbes and moisture into contact with thatch. When beginning a topdressing program, it is important to realize that this is a long-term approach to improving soil conditions and that a single treatment will not produce good quality results. Frequent, light soil topdressings have been repeatedly shown to be the most effective and consistent method to reduce thatch. Thick applications of topdressing or sand are not recommended and will only compound the problem by causing a layering effect and possibly increasing disease incidence. This results in restricted water and air movement and encourages shallow root systems. Topdressing soil should be weed- and nematode-free (sterilized is ideal) and should be of the same type as the soil on which the turf is growing. Topdressing should begin in early spring when turf begins active growth. Light, frequent topdressings provide quickest results compared to infrequent, heavier ones.



Figure 6. Topspreading Often Follows Verticutting or Aerification. Repeated Applications Are Needed for Best Results.

While the above practices are common on highly managed turf, they are not always needed in home lawns. Homeowners are sometimes convinced that buying these services will improve the condition of their lawns, and may spend unnecessary money on unneeded practices. Thatch is seldom a problem in younger lawns, but can sometimes become a problem in older lawns, particularly ones that have been over-fertilized and over-irrigated.

Summary

The following steps should be followed to control thatch formation.

- Mow at recommended height and frequency.
- Avoid indiscriminate use of fertilizer. Use minimal amounts of nitrogen, and soil test for phosphorus levels.
- Maintain a soil environment conducive to rapid decomposition. This includes adequate aeration, irrigation, and soil pH control.
- Core cultivation (aerification) can help control thatch formation and soil layering.
- Topdressing with sand provides the best biological control of thatch. Proper timing and rates are necessary to provide the best thatch control with the least chance of disease occurrence.
- Use vertical mowers if mechanical removal of thatch becomes necessary. Follow this with irrigation.

Table 1. Approximate soil volumes needed to topdress 5000 square feet to various depths.

Depth (inches)	Soil Volume (cu yds/5000 sq ft)
1/32 (0.03)	1/2
1/16 (0.06)	1
1/8 (0.13)	2
1/4 (0.25)	4
1/2 (0.50)	8