

Thatch is defined as an accumulation of dead and living plant material (stems, roots, and shoots) that develops between the soil surface and the green leaves of a turf. Thatch development is a natural process that occurs during normal growth. Ideally, under proper management, a turf achieves a balance between rate of organic matter production and rate of decomposition.

Some thatch is desirable because it forms a cushion that decreases turf wear. Thatch also insulates the soil from high and low temperatures and reduces evaporation losses of water from the soil surface. A thatch layer becomes undesirable when it exceeds a depth of 1/2 inch.

## **Thatch Problems**

Excessive thatch accumulations can cause the following problems:

1. Thatch restricts water and air movement into the soil which are both needed for good root growth. This also leads to more frequent watering.
2. Thatch provides an ideal environment for some turf insects and disease organisms, such as brown patch and dollar spot.
3. Thatch makes mowing difficult because the turf becomes spongy. This lets the mower to sink into the turf and cause scalping. Scalping causes brown turf areas because all leaves have been removed.
4. Thatch raises the growing points (crowns), runners (rhizomes and stolons), and roots above the soil surface. These plant parts are then exposed to greater extremes in temperature, which often cause winter injury.
5. Thatch can restrict downward movement of pesticides and fertilizers in the soil. This results in reduced effectiveness of these materials.

## **Causes of Thatch Buildup**

Thatch buildup is caused by the following factors:

1. The major cause of thatch buildup may be the overuse of nitrogen fertilizers. Although nitrogen produces a dark green color, it also increases plant growth rate that causes thatch buildup.
2. Another common cause of thatch buildup is improper mowing. A turf should be mowed often enough so no more than one-third of the plant material is removed. *Example:* If a turf is cut at a height of 2 inches, mow the grass when it reaches 3 inches. If a turf is mowed at the proper frequency, the clippings may be left to fall back into the turf without contributing to thatch accumulation. How often a turf should be mowed is determined by its growth rate. The use of a mulching mower alone will not prevent a thatch problem.

3. Thatch buildup is also caused by failure to maintain a soil environment favorable for microbial activity. A proper environment includes adequate moisture, aeration and a soil pH around 6.5.

## Preventing Thatch Buildup

The best method of thatch control is to prevent its buildup. The following suggestions will help prevent thatch buildup:

1. Fertilize according to soil test recommendations and be sure not to apply excessive nitrogen.
2. Water only when the turf shows signs of moisture stress; wet the soil to a depth of 6 to 8 inches.
3. Avoid the use of pesticides as much as possible.
4. Mow often enough so that no more than one-third of the leaf surface is removed at one mowing.
5. Remove tree leaves and grass clippings when they accumulate on the turf surface.

## Thatch Removal

Examine thatch depth by using a knife, spade, or soil probe to remove a small section of turf (soil included). If the thatch layer is thicker than 1/2 inch, dethatching is needed. Remember that thatch buildup is gradual and occurs over a period of years. Therefore, it's logical that a thatch removal program should also be gradual.

The following cultural practices are effective methods of thatch removal:

1. Topdressing once or twice a year with a 1/4 inch layer of topsoil is the most effective method of thatch reduction. This practice increases the thatch decomposition rate. Heavier applications of topsoil may cause layering, which restricts water, air and fertilizer movement in the soil. However, a top-dressing is also the least practical cultural practice because of the cost of specialized equipment, top-soil and labor. Topdressing can also be a source of weed seed.
2. Vertical mowing is the most common method of thatch removal. This specialized mower has evenly spaced blades that revolve perpendicularly to the turf and slice into the thatch to mechanically remove it. It is very important to use proper blade spacing when vertically mowing different turfgrasses. Use a blade spacing of 1 to 2 inches for bermudagrass and zoysiagrass, 2 to 3 inches for centipedegrass, and 3 inches for St. Augustinegrass. Bermudagrass may be mowed down to the soil level in several directions without killing the lawn because of underground rhizomes. Centipedegrass and St. Augustinegrass should only be vertical mowed in one direction to avoid removing too much plant material and reducing the rate of recovery. If a thatch layer exceeds 1/2 inch depth, the turf area should be carefully vertically mowed and allowed to recover between mowings. Vertical mowing is best done in the spring after greenup where the grass is growing

- rapidly and when the weather is not so hot that turf water needs are high. Another good time to vertical mow is in early spring just before greenup occurs.
3. Power raking uses the same mechanical principles as vertical mowing. Flexible, spring steel wires revolve at high speed vertically through the turf and loosens the debris for removal. Power raking can be useful for loosening debris, but it is not as effective as vertical mowing.
  4. Scalping is a poor substitute for vertical mowing, but its use, especially in early spring may delay the need for vertical mowing where build up is minimal. Scalping is a procedure in which the turf is mowed at a much lower height than normal. Scalping heights will vary with turfgrass species. Turfgrasses with rhizomes, like bermudagrass and zoysiagrass, may be scalped down to near the soil surface. Centipedegrass and St. Augustinegrass spread by above-ground runners called stolons. Removing these stolons would kill the turf. Zoysiagrass is not as sensitive to scalping as centipede and St. Augustine, but it is more sensitive than bermuda. Scalping below the crown or green growing points of zoysia will cause excessive damage.
  5. Core aeration benefits thatch decomposition primarily through the indirect effects that stimulate bacterial activity. Core aeration also relieves soil compaction and increases air and water movement into the soil. This is best accomplished by a power aerator that has hollow tines or spoons, so it removes a soil core 2 to 3 inches deep and 1/2 to 3/4 of an inch in diameter. Core aeration should be done during periods of active plant growth and when the soil is moist enough to allow deep penetration. Applying a fertilizer as recommended by soil analysis after a cultural practice will increase the rate of turf recovery.

## Summary

Thatch development is a normal process. If thatch depth exceed 1/2 inch, take steps to remove the excess. A good turf management program includes preventive practices that reduce thatch accumulation and curative practices used to remove the excess.

### **Leaflet 394/Reprinted April, 2002**

The University of Georgia and Ft. Valley State University, the U.S. Department of Agriculture and counties of the state cooperating. The Cooperative Extension Service, the University of Georgia College of Agricultural and Environmental Sciences offers educational programs, assistance and materials to all people without regard to race, color, national origin, age, sex or disability.

**An Equal Opportunity Employer/Affirmative Action Organization Committed to a Diverse Work Force**

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914,  
The University of Georgia College of Agricultural and Environmental Sciences and the  
U.S. Department of Agriculture cooperating.

Gale A. Buchanan, Dean and Director