



## Thatch Control in the Home Lawn

by David D. Minner and Eldon Everhart

Thatch is an accumulated layer of living and dead plant parts that build up between the soil surface and the green canopy of grass blades. It resembles a spongy layer of peat moss (Figure 1).

Thatch can be beneficial and problematic. Thatch supplies necessary food sources for microbes and organic matter to incorporate into the soil. But excessive thatch also can harbor diseases that cause fungi and interfere with the helpful nutrients of soil. Thatch that is properly balanced promotes growth and appearance of a well-groomed lawn (see PM1755, *Understanding Thatch in the Home Lawn*). Proper balance of thatch requires a combination of management practices. These include preventing thatch buildup by reducing plant growth, improving microbial decomposition, and mechanical removal of thatch when necessary.

### Preventing thatch

- Adopt a lower maintenance philosophy and don't be infatuated with dark green color. Instead, be content with a healthy and dense lawn that has a uniform green color, not necessarily the darkest green. Lawns have a maximum color and density that are genetically determined by grass varieties in the lawn. Forcing a lawn beyond its potential will lead to thatch accumulation and will require additional work to prevent or remove problem thatch. Some lawn care enthusiasts are absolutely obsessed with having the thickest, darkest green, and lowest cut lawn in the

neighborhood. To achieve their passions, lawns are mowed too low, and nitrogen and watering are applied at rates that exceed what is necessary to produce a pleasant lawn. Lawns receiving this extra “tender love and care” are actually more prone to thatch buildup. Instead of forcing grass growth, select cultivars that provide the same appearance without extra work. Kentucky bluegrass varieties, such as Midnight, Blackburg, Able I, Barsweet, and Eclipse, remain darker green without using extra nitrogen. These varieties also are compact types that have reduced vertical growth and tolerate closer mowing. Tall fescue and perennial ryegrass are other lawn species used in Iowa that seldom develop thatch problems.

- Reduce nitrogen to slow plant growth and reduce biomass production. If using more than 4 pounds N/1,000 square feet/year then reduce yearly nitrogen rate. Some lawns on productive soils may only need 1 or 2 pounds N/1,000 square feet/year. Lawns receiving less nitrogen wilt less and require less frequent watering. Compost or an organic source of nitrogen should be alternated with inorganic sources of nitrogen in your annual lawn fertility program.



Figure 1. Thatch is a distinct layer of spongy brown organic matter consisting of living and dead roots, crowns, and lower shoots.

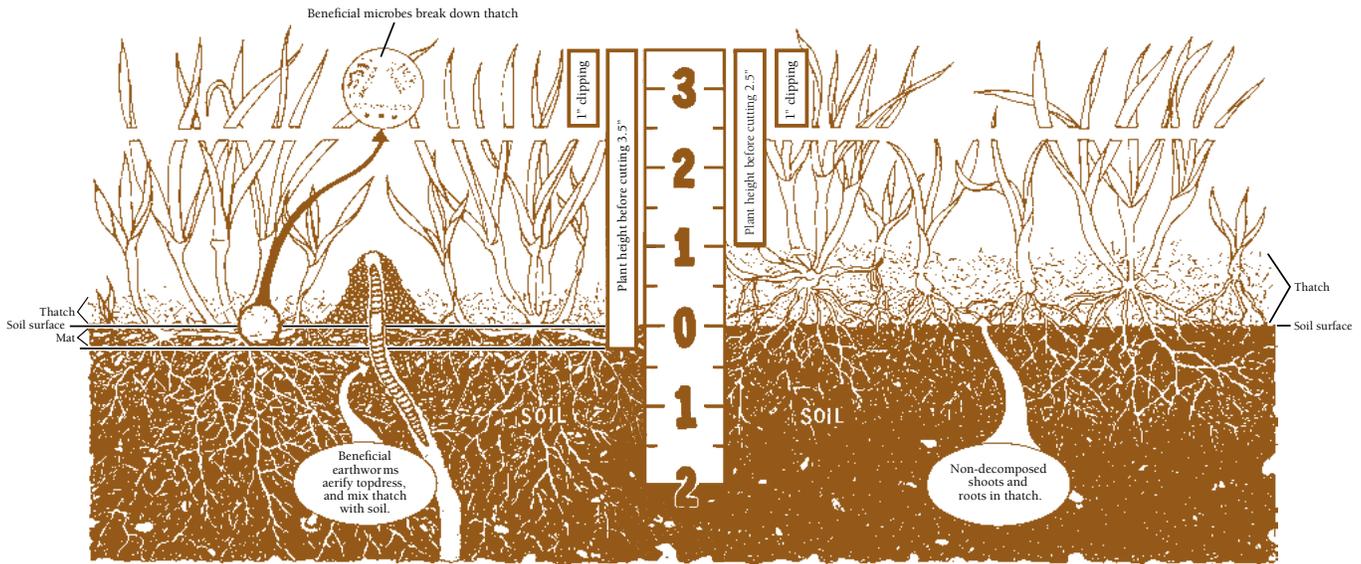


Figure 2. A beneficial thatch and mat in a balanced lawn (left) compared with an excessive thatch in an unbalanced lawn (right).

- Water every seven days or as needed in dry periods to maintain moderate growth and encourage deep rooting. Between waterings allow the lawn to slightly wilt to ensure that overwatering and forced growth do not occur. Lawns that are prone to thatch accumulation should not be allowed to go into summer dormancy. During summer dormancy, lawns that are not watered turn brown and usually, but not always, recover during cooler and wet conditions in the fall. Surface roots and shoots that quickly die, during summer dormancy, make a substantial contribution to thatch accumulation. Thatchy Kentucky bluegrass lawns that are stressed by summer dormancy are very susceptible to the lawn disease Summer Patch.
- Discreetly use pesticides that harm beneficial, non-target organisms. Instead of routine treatment with pesticides, treat pests curatively by first properly identifying the pest and then applying the proper control. Microbial decay of thatch is greatest during warm moist conditions of summer. Microbial breakdown of thatch stops in dry lawns that are allowed to go summer dormant.
- Speed thatch decay by encouraging microorganism activity. The word microorganism is a broad description for microscopic living organisms. Microorganisms are animals and plants that are too small to be seen with the naked eye. They include nematodes, protozoa, fungi, bacteria, and actinomycetes. Microorganisms recycle dead plant material from thatch by decomposing it into humus—a stable form of organic matter that

serves as a food source for plants (Figure 2). Factors influencing microbial activity include temperature, moisture, aeration, pH, and inorganic nutrient supply. A soil pH of 6.5 is ideal for maximum microbial activity and decomposition of thatch. Use lime on acid soils to raise pH or acidifying fertilizers (ammonium nitrate or ammonium sulfate) or sulfur to lower pH.

- Aerating by core cultivation greatly improves the thatch/soil micro-environment. A core aerating machine punches hollow tines into the soil and removes small soil cores about the size of your index finger (Figures 3 and 6). Do not remove the soil cores from the surface. Once dry, mowing will crumble the cores and deposit a beneficial layer of soil on the thatch surface. This mixing of soil and thatch along with improved aeration increases microorganism activity and thatch decay.



Figure 3. A core aerating machine removes soil plugs and spreads them on the lawn.

Core aerating should not be looked upon as a method of removing large amounts of thatch. Rather, it is most effective as a means of preventing thatch from developing. Homeowners who have lawns receiving high maintenance should seriously consider annual core aerating.

- Topdressing is a very effective means of managing thatch. As thatch becomes thicker, there is less physical contact between the actual soil surface and the top of the thatch layer. Because of this physical separation microbes in the soil can not act upon most of the thatch. Spreading a thin layer of soil or compost,  $\frac{1}{8}$ - to  $\frac{1}{4}$ -inch, over the thatch surface (topdressing) ensures good contact between thatch and microorganisms.

**Approximate volume of soil or compost needed to topdress 5,000 square feet at various depths.**

Depth (inches)	Topdressing volume (cubic yards/5,000 square feet)
$\frac{1}{16}$ (0.06)	1
$\frac{1}{8}$ (0.13)	2
$\frac{1}{4}$ (0.25)	4
$\frac{1}{2}$ (0.50)	8

**Removing thatch**

Examine the lawn closely regardless of how healthy it appears. From several places in the lawn, cut small plugs three inches deep. Lift and examine the grass and soil profile. If thatch is present, it will appear as a distinct horizontal layer of brown spongy or felt-like material located on top of the soil and below the green blades (Figure 1). A thatch layer of  $\frac{1}{2}$  inch or less is considered normal and requires no mechanical removal. When thatch is  $\frac{1}{2}$  to  $1\frac{1}{2}$  inches thick the only effective means of reduction is by mechanical removal. A variety of dethatching machines are available. Most are slightly bigger than a lawn mower and some are self-propelled.

**Dethatching checklist**

Save time and money—develop a dethatching plan from the following checklist before renting equipment.

- How thick is your thatch?
- What type of dethatcher will you use, a power rake or a vertical mower?
- Do the blades or spring tines on dethatching equipment need replacing?
- When will you dethatch? Have you allowed sufficient time for the lawn to recover from the stress of dethatching?

- Plan on collecting three or more garbage bags of thatch per 1,000 square feet of lawn. An average lawn is between 8,000 and 10,000 square feet.
- Where will you put all of the thatch you remove from the lawn? Most communities no longer allow yard waste in the landfill. Consider using it in your compost pile.
- Who will help you? Have your helpers raking and bagging the loose thatch while you continue to make multiple passes over the lawn with the dethatching machine that is rented by the hour.
- Are you just dethatching or will you also be reseeding? See guide Pm-1055 *Turfgrass Renovation*.
- Consider having a lawn care service dethatch your lawn.

The most common machine used to remove thatch is a vertical mower (Figure 4). Knifelike blades are evenly spaced and rotate perpendicular to the thatch surface. The vertical mower blades slice through the thatch and about  $\frac{1}{4}$  inch into the soil surface. It is important to set the machine low enough so that some soil is deposited on the surface. Check the vertical mower before leaving the rental store to be sure the blade length is sufficient to cut through the thatch and contact the soil. After vertical mowing, hand rake the loose thatch from the surface and leave the soil as a beneficial layer of topdressing. In addition to dethatching, a vertical mower can be used when



Figure 4. A vertical mower cuts through thatch and mixes soil into the existing thatch layer. Loose thatch deposited on the surface is hand raked for removal. The mower also can be used to prepare a good seedbed with channels for seed entry during lawn renovation.

renovating and preparing the surface for overseeding. A power rake is another type of machine used to remove thatch. It is different from a vertical mower because it has spring steel tines that loosen thatch without cutting

into the soil (Figure 5). Power raking does not have the added benefit of mixing soil and thatch.



Figure 5. A spring-tined power rake can be used to remove about one quarter inch of thatch.

Lawns should be dethatched only when conditions favor rapid turf recovery. Allow for three to four weeks of good growing weather following a severe dethatching. Vertical mowing and power raking are effective means of removing thatch; however, the slicing and ripping action during dethatching causes considerable stress on the lawn. For cool season grasses, such as Kentucky bluegrass, early fall dethatching is most desirable. Lawns can be dethatched in the spring; however, competition from annual grasses, such as crabgrass, will be much greater. If it is necessary to power rake a lawn in spring, be sure to follow with an application of a preemergence herbicide to control annual grasses. Do not dethatch after applying a preemergence herbicide because the herbicide barrier may be disrupted allowing weeds to germinate. Avoid mechanical dethatching in the summer.

Applying a light rate of fertilizer following mechanical dethatching will help the grass recover from injury.

Lawns with a serious thatch problem may require a severe power raking each fall until thatch depth is less than  $\frac{1}{2}$  inch. Then an integrated program of preventing methods may be used. If the lawn has more than  $1\frac{1}{2}$  inches of thatch, it will be necessary to have the thatch and sod stripped off. The lawn may then be reestablished from seed or sod.

Thatch development is a normal process in all lawns but can become a problem when the thatch layer is too thick. Thatch can be managed by moderating plant growth and encouraging microbial decay. Specialized equipment, such as vertical mowers and power rakes, can be rented to remove excess thatch.



Figure 6. Soil cores from aerating machine are left on the surface to break down and provide a layer of topdressing.

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