



A thatchy bentgrass fairway. Thatch accumulation is the Achilles heel of bentgrass fairway turf.

Answering the Most-Asked Questions About Thatch

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WITH GOLFERS' increasing expectations for closely cut fairways, tees, and greens, creeping bentgrass use in this country and around the world has never been greater. From time to time, it is important to re-acquaint ourselves with management factors of bentgrass and bermudagrass and thatch development. Thatch control is one of the more important ones.

QUESTION: What is thatch?

In the Dictionary of Golf Turfgrass Terms, published by the Green Section, thatch is defined as a "tightly intermingled layer of dead and living parts (roots, stolons, shoots, stems, leaf tissue, etc.) that develops between the green vegetation and soil surface.

QUESTION: How much thatch is too much?

Generally, some degree of thatch is necessary and desirable. It depends. A modest layer of one quarter to half an inch helps the soil to retain moisture, the turf to resist wear, and provides resiliency in the sod. Concern arises when the accumulation exceeds one half to three quarters of an inch.

QUESTION: What factors contribute to thatch accumulation?

Several primary ones. Basically, thatch accumulates and becomes a problem when it develops more rapidly than natural forces decompose it. Factors like 1) frequency of mowing, 2) height of cut, 3) amount of traffic over the area, 4) excessive growth from fertilization, 5) type

of mower used, *i.e.*, floating versus rigid mowing heads, 6) type of grass, 7) use of certain pesticides, 8) clipping removal, 9) topdressing, aeration, and vertical mowing practices, 10) irrigation and drainage factors. There may be other reasons for thatch accumulation, but these are the primary ones.

QUESTION: Why is excess thatch undesirable?

A number of reasons. Excess thatch harbors insects and diseases. It also ties up pesticides, especially herbicides and insecticides, which should move down into the soil profile for maximum effectiveness. While a little thatch helps the soil retain moisture, too much (especially when it dries out) impedes the movement of water into the soil, contri-

buting to such problems as isolated or localized dry spots. Grass growing in deep thatch is much more shallow rooted, which contributes to a number of problems ranging from increased winterkill, reduced drought stress, and a tendency for the grass to become fluffy, puffy, and prone to scalping by mowers.

The importance of deep rooting is well-known, but it was brought into clear focus last season in some eastern states where severe restrictions were placed on water use for golf course fairway irrigation, brought about by an extended drought. Thatchy fairway turf suffered most. Fairways with less thatch and with deeper rooting survived very well, surprising even the most optimistic turf managers. Bentgrass fairways survived well enough and provided golfers with outstanding playability, even though natural rainfall was the primary moisture source throughout the season. It was found that as long as thatch was not a problem and lightweight three- or four-gang fairway mowers were used (along with some type of clipping removal program), very little grass was lost, even with no irrigation. On the other hand, thatchy bentgrass turf suffered badly. The key seemed to be the depth of the thatch, the general health of the grass, and the depth of the rooting system.

At the same time, let's not forget playability. Thatchy turf does not play well. Soft, spongy turf does not hold the ball up for a proper golf shot, and footprinting is annoying on greens. Therefore, besides the agronomics of growing turfgrass, controlling excess thatch should be a priority item on every golf course.

QUESTION: If I have too much thatch, how do I control it?

One can bring a number of cultural practices to bear on this subject. If you will refer to the earlier question on the causes of thatch accumulation, you'll find at least 10 clues on how it might be controlled: increase frequency of mowing, lower the height of cut, avoid excess fertilization. Item 9 on that list, "topdressing, aeration and vertical mowing," receives particular mention here.

Research supported by the Green Section some years ago found that a combination of aerations and topdressings can reduce thatch over a time. Intermingling topdressing and/or soil cores in the thatch area increases microbial activity, which in turn decomposes the organic material. Aeration helps break up the thatch mat, improving such things as air

and water movement within the thatch and soil zones, encouraging deeper root systems, and overall creating a better, healthier, dynamic microbial environment.

Another effective biological means, often overlooked and neglected, is the light and frequent use of hydrated lime in thatch control. The presence of free calcium is important if not essential to soil microbial activity. Most thatch areas are naturally low in pH and free calcium is scarce. Hydrated lime carries an abundance of free calcium (it does not have to weather before it becomes available). By applying hydrated lime at the rate of two pounds per 1,000 square feet (100 pounds per acre) in the early spring, late spring, and early fall, marked improvement in natural thatch decomposition will be noted within a year or two. The presence of free calcium stimulates the soil microbes, and they in turn attack and decompose the thatch. Hydrated lime should be mixed with topdressing soils or sand for use on greens and tees or applied with a drop spreader on fairways. It will work miracles under most thatchy situations.

QUESTION: What about vertical mowing?

The old practice of deep, infrequent, severe vertical mowing has contributed very little to long-term thatch control. In too many cases, it has contributed to a short term for the golf course superintendent! Bentgrass greens subjected to this treatment take weeks to recover (sometimes months).

Vertical mowing nevertheless can play a major role in any thatch reduction program. By carrying out light, frequent, and double vertical mowings on bentgrass greens (perhaps every two or three weeks during active growing periods), thatch can be checked and eventually reduced.

The vertical mower should be set so that the rotating blades of the machine just make contact with the blades of grass and do not cut into the crown of the plant or the soil itself. At this very light setting, bent greens may be double cut (at a 90° angle) every few weeks during the active growing season, however, but not during periods of very high temperatures.

QUESTION: What are the best methods of controlling thatch on bentgrass or bermudagrass fairways?

Certainly the use of lightweight mowers (triplex or five-gang units) and the re-



moval of clippings will help considerably in improving fairway quality. The very same practices and procedures used on greens and tees for thatch control will also work on fairway turf, but of course the scale must be much larger.

An aggressive fairway aeration program will break up the matted turf, relieve compaction, and bring up fresh soil cores that will serve as topdressing material. The more soil brought up the better. This is why more and more golf courses are using hollow-tine putting green-type aerators on fairways. It is slow and expensive, but it does the required job. Of course, conventional fairway aerifiers will do a good job if they're used often enough. Several new pieces of fairway aeration equipment have been developed in recent years. Perhaps this is a sign of the times and a realization of the importance of fairway aeration and its resulting topdressing in thatch control.

Again, the use of hydrated lime several times a year (during cooler periods) at 100 pounds per acre will significantly contribute to thatch reduction. Mowing and fertilization practices, pesticide use, along with other measures, are all elements in the same game.

Vertical mowers on fairways are also of increasing importance. Indeed, deep vertical mowing of fairways does have a



place, particularly in the South, where it is used not only to slice through the mat and bring up fresh soil, but for preparing winter seedbeds as well.

In summary, thatch control on greens, tees, and fairways is within today's realm of turfgrass management. It requires an aggressive, persistent and planned program. The problem will not be corrected overnight, but like most problems in this business, it will yield to the experiences of the past, modern research, and the development of new, innovative equipment. Thatch — be gone.

(Top, left) In contrast, a turf with little or no thatch.

(Top, right) Grinding up the soil cores for fairway topdressing.

(Left) Traditional fairway aeration, two times over. Large holes that are slow to heal. Nevertheless, a necessary program.

(Above) Intensive springtime fairway aeration with putting green equipment.