

Latest Thatch Information Is Helpful But Controversial

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Thatch is a management problem on many turfgrass sites. The turfgrass manager is faced with maintaining turf on these areas under difficult and sometimes impossible conditions. In many cases, the turf manager is unaware of the integrated and complicated factors that are related to thatch accumulation and its influence on turfgrass stress and culture.

Considerable advances have been made in our knowledge about thatch during the past few years. We have learned new aspects about thatch, and its chemical and physical nature, causes, problems, benefits and prevention. Although considerable knowledge about thatch has been gained, more is needed and controversy exists over the knowledge we have gained so far. This is substantiated in the following articles included in this Symposium.

Thatch has been defined as "An intermingled organic layer of dead and living shoots, stems, and roots that develops between the zone of green vegetation and the soil surface." Careful examination of this definition indicates that emphasis is placed upon the intermingled layer of dead and living organic matter comprised of shoots, stems, and roots. In thinking this over, soil on a thatch-free, turfgrass site consists of living and dead organic matter comprised of shoots, and roots. The above definition of thatch therefore, is not entirely satisfactory. Thatch is a media located above the soil surface and is comprised of undecomposed and decomposed organic matter that is capable of supporting turfgrass plant growth. Mat is an additional term that adds confusion to the situation. Mat is not synonymous with thatch. Mat consists of a tightly intermingled layer of soil and decomposing organic matter. The added soil factor makes mat a more desirable growing media than thatch alone.

The chemical composition of thatch is mostly cellulose, hemicellulose, and lignin. Lignin is particularly prominent in the lower thatch where decomposition is more advanced. Turfgrass clippings contain very little lignin and decompose rapidly. As long as an adequate mowing frequency is maintained, clippings do not contribute significantly to thatch accumulation. Thatch may accumulate in intensively managed turfs such as creeping bentgrass or bermudagrass or it may accumulate in low maintenance turfs such as creeping red fescue or zoysiagrass. The cause of thatch accumulation, therefore, is not just the production of organic matter versus the rate of decomposition, but also the chemical composition of the plant materials comprising thatch.

The causes of thatch accumulation are equally as controversial as the definition of thatch. One can readily accept that if organic matter production exceeds the rate of decomposition then the net effect should be thatch accumulation. Factors that encourage organic matter production and discourage organic matter decomposition favor this accumulation. Cultural practices must be adjusted to avoid

TABLE 1. Advantages and disadvantages of thatch in a turfgrass community.

Advantages (When present in moderate amounts):

1. Insulates the soil surface beneath the thatch layer
2. Reduces soil compaction
3. Increases the resiliency or cushioning effect of the turf
4. Increases turfgrass wear tolerance*

Disadvantages (When present in excessive amounts):

1. Increases turfgrass environmental stress
2. Reduces turfgrass tolerance to heat, cold, and drought
3. Increases disease incidence
4. Increases insect activity
5. Increases puffiness, scalping, foot-printing, and spiking
6. Increases proneness to localized dry spots
7. Increases susceptibility to iron chlorosis
8. Reduces activity of certain pesticides
9. Increases phytotoxicity of certain pesticides

**Research at the University of Nebraska indicates that wear tolerance increases with thatch accumulation until a critical point is reached, when wear tolerance decreases.*

excessive organic matter production, and to provide an environment conducive to thatch decomposition. Earthworms and some insects are known to digest portions of the organic matter. They are important in relocating organic matter throughout the soil profile with their movement up and down in the soil. Certain pesticides reduce earthworm populations and induce thatch accumulation.

Contradictions also exist concerning the role of turfgrass cultivars, nitrogen, and mowing height in the accumulation of thatch. The turfgrass cultivar and mowing height may play a more important role in thatch accumulation than excessive nitrogen fertilization. Regardless of the cause of accumulation thatch is involved in beneficial and detrimental aspects in the turfgrass community (Table 1.). These factors are covered in detail in the subsequent articles.

In the past ten years we have gained considerably in our knowledge about thatch and its interaction with turfgrass culture and stress. As turfgrass managers we need to become more aware of the causes of thatch; its detrimental and beneficial aspects; its prevention; and perhaps most importantly, its modification to a more desirable growing media. The articles included in this Symposium will inform the reader of the present state of knowledge about thatch and will give the reader a better background for coping with this maintenance problem.