JB COMMENTS

Diagnosing Summerkill

A wide array of environmental, biological, and soil stresses can occur during the summer period which fall under the general descriptive term of summerkill. To impose proper cultural practices that minimize the potential for injury from these various stresses, it is important to properly diagnose the specific stress or stresses most likely to occur during various parts of the summer in a given location. **Unfortunately, there are too many turfgrass managers who attempt to solve summerkill turf problems by simply removing pest protection chemicals from the shelf and applying at intervals as close as two days.** Typically, this is done without having properly diagnosed that a pest problem exists. Evidently these turfgrass managers are having difficulty accepting that summer turf loss can be the result of an environmental stress rather than a turfgrass pest.

In recent years the term bentgrass decline has been popularized. An array of causes have been attributed to this problem, frequently with emphasis on certain diseases. While many of these potential stresses can contribute to a reduction in the amount of root and shoot biomass, they are not necessarily the keys to avoiding summerkill. **In many situations, heat stress is the dominant problem that must be addressed. It should be noted that serious root loss and turf thinning occur in bentgrass (*Agrostis* spp.) at soil temperatures above 86°F (30°C).** This was well researched in the late 1950s.

I frequently get phone calls from around the United States and the world concerning problems being experienced with summerkill. Typically, they are trying to describe symptoms and asking what disease problem it might be. When I ask them for the specific soil temperature on the site where the problem is occurring, the typical situation is silence. In other words, there has been no attempt to monitor soil temperatures. If this has not been done, it becomes very difficult to properly diagnose a summer turf problem. Thus, the lead article on heat stress in this issue is very important, especially during this 1998 summer of extraordinarily high temperatures early in the growing season.

RESEARCH SUMMARY

Leaf Mulching Effects on Turfgrasses

Disposal of fallen tree leaves during the autumn period is an annual problem which requires substantial labor and cost for removal and disposal. It has been estimated that a woodland will drop approximately 3,000 pounds per acre per year (3,360 kg/ha/yr) of tree litter. The objective of the study was to assess the long-term effects of tree leaf mulching into a turf canopy of perennial ryegrass (*Lolium perenne*). Shredded leaves from maple (*Acer* spp.) trees were applied at rates of 0, 2,000, and 4,000 pounds per acre (0, 2,240, and 4,480 kg/ha). The experimental areas received irrigation as needed to prevent visual plant water stress. The experimental assessments included (a) monthly weight of clippings produced, (b) monthly visual turfgrass quality and color ratings, and (c) annual thatch depth, soil pH, and soil nutrient levels.

Following three years of leaf mulch treatments and turf-soil assessments the results of this study are as follows: The tree leaf mulching had no effect on:

- visual turfgrass quality
- visual turfgrass color
- turfgrass growth measured as clippings weight
- thatch/mat depth
- disease incidence
- weed invasion
- soil pH
- soil nutrient levels

Thus, the results after three years indicate there have been no significant negative effects on turfgrass growth. This suggests that mulching tree leaves into a turf canopy is an economical method of disposal. This study will be continued for three more years during which these turfgrass responses will be assessed for any subsequent longer-term effects that may emerge. **By A. Reicher and G. Hardebeck, 1997 Annual Report of Purdue University Turfgrass Science Program, B-771, p. 19.**

ASK DR. BEARD

Q *How can one distinguish between turf loss by heat stress versus water stress?*

A **It is very difficult to distinguish the cause of death in midsummer between heat and water stresses,** even though they are distinctly different in terms of their mechanistic cause. For example, during heat stress, one of the first occurrences is dieback of the root system at temperature above 86°F (30°C) with no new root initiation and replacement. Subsequently, during periods of high evapotranspiration, an internal plant water stress develops because the turf water loss by evapotranspiration is exceeding the rate of water uptake through the root system. Physiologically, one of the first changes as an internal plant water stress develops is closure of the stomata. On hot days the internal leaf temperature can rise to acute lethal levels above 104°F (40°C) within 30 to 60 minutes after stomatal closure. **In this situation the final cause of death was heat stress, but it was induced as a result of an internal plant water deficit.** This indicates that maintaining a positive plant water balance can be important in minimizing certain types of heat stress.

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