



# Old Problems, New Challenges

Nuisance problems have emerged as major management issues on golf courses.

BY DARIN S. BEVARD

Challenges for turfgrass maintenance have been a constant in the golf course industry since its beginnings. In recent years, maladies that used to be viewed as nuisances, curiosities, or annoyances have emerged as full-blown turf management issues. Major turfgrass problems still occur on golf courses, but more time seems to be spent dealing with these “little problems” than ever before. The increase in these problems coincides with increasing golfer expectations, but golfer expectations alone cannot explain why these problems have emerged. Although everything is relative, golfer expectations have always seemed to trend toward the high end of the conditions that *can* be maintained on golf courses. Interestingly, some of these problems are some of the most difficult to control and explain. Certainly, the emergence of these problems is complex and likely the result of multiple management factors.

Diseases such as fairy ring have occurred more often or at least have garnered more attention in

recent years. This disease has created aesthetic and playability nightmares on many golf courses. Cultural and chemical treatments are very effective or else completely ineffective, depending upon factors that are not completely understood. More research is being conducted to better understand fairy ring because of its emergence as a significant turf problem. Soil diseases such as root Pythium dysfunction and take-all patch are difficult to control once they are active. Creeping bentgrass collars decline uncontrollably during the heat of summer. In some instances, more conservative maintenance practices in conjunction with intense fungicide programs provide little relief.

Localized dry spots (LDS) seem more prevalent than ever during any periods with below normal rainfall, requiring more hand watering. Earthworms and ants cause turfgrass damage through casting and mounding of soil that create major issues with playability, appearance, and maintenance. Earthworm control is

The intensity of maintenance at higher budget golf courses has created a standard whereby any blemish is easily noticed. Maladies that may have been present in the past, but went unnoticed by golfers because turf quality was inferior, are now easily picked out.





Inconsistent dew patterns may be an early indicator of localized dry spot. Localized dry spots create water management challenges that require frequent hand watering to prevent turf decline. This condition has become more of an issue in recent years as management practices have changed to meet golfer expectations.

illegal and controlling nuisance ants in fine turf areas is an ongoing battle.

These are just a sampling of some old problems that have emerged as major challenges in everyday turfgrass management. If we could truly define the root cause of these issues, maintenance programs could be changed to limit their impacts on turf quality. Unfortunately, pinpointing a single reason why these problems have emerged is extremely difficult. Of equal frustration is trying to explain why these problems occur on some golf courses, or even specific areas of an individual golf course, but not on others, in spite of maintenance programs and other factors that are summarily the same. There are many variable factors that may contribute to these problems. This article will not serve to define control options for these issues. Rather, it will explore some of the changes that have occurred in turfgrass management that may help to explain the emergence of these problems, helping to mitigate their impacts or at least allow some acceptance of these maintenance challenges.

### GRASS SELECTION

Grass selection for golf courses plays a role in these “new” problems, especially in the transition zone regions of the country. As our ability to provide excellent playing conditions with cool-season grasses in warmer climates has improved, these grasses have been pushed into regions that

provide tremendous challenges during times of summer stress. Creeping bentgrass varieties for putting greens, especially, have been pushed into difficult areas with expectations that cannot be provided. The idea that perfect playing conditions can be maintained during times of the growing season when survival of the grass is a better goal is not realistic. Technological advancements cannot overcome physiological limitations of the turfgrass under certain conditions, yet we often expect them to. Increased management intensity on grasses that are pushed to geographical limits during periods of maximum environmental stress creates a potential opportunity for even weak pathogens and pests to create major turfgrass problems.

### CHEMICAL CHANGES

Chemical pesticide options that are available for use on golf courses are more numerous than ever. Our understanding of how these chemicals work is more complete because the screening process for their registration is more stringent. However, many of our commonly used chemicals have site-specific modes of action that target specific insect or disease organisms. Many insecticides currently used on golf courses are only effective on a specific growth stage in the life cycle of an insect pest, so timing is critical. Non-target effects are minimal compared to older chemistries; persistence in the soil of contact insecticides is short, and some are tightly bound to organic matter, which may further reduce potential non-target activity. Broad-spectrum activity, high toxicity to target pests, and long soil residual are a strong combination to provide good pest control for a long time. Most of our existing insecticides lack this combination of characteristics.

Earthworms are an indicator of healthy soil and provide many benefits for the turf. However, earthworm castings play havoc with maintenance and playability. In the case of earthworm development, earthworm suppression was a side effect of insecticide products that are no longer available. One specific example is the insecticide chlordane. Chlordane and related compounds were very effective against a wide variety of targeted insect pests and some non-target organisms, including earthworms. The mean half-life of chlordane (the time at which half of the chemical degrades in the soil) is reported by the EPA to be 3.3 years. Half-life of chlordane



varies by soil type because it is tightly bound to soil particles. Thus, a single application of chlordane could provide residual control of soil-borne pests for several years. Frequency of application varied by the pest targeted. If chlordane was applied every other year in a five-year period, prior to application in the fifth year of application, soil residual would be slightly higher than the initial rate of application. With the year five application, the residual in the soil would be double the initial application rate. Depending upon the interval and rate of application, chlordane could remain in the soil at rates high enough to maintain continuous control of various pest problems.

Other insecticides that research showed to be toxic to earthworms, including bendiocarb (Turcam) and ethoprop (Mocap), have been discontinued for use on turf. Research has shown that one of the side effects of insect control applications with these products was earthworm suppression.

Similarly, the elimination of mercury compounds and other fungicide products has changed disease control, especially for some of our hard-to-control diseases such as take-all patch. Mercury provided control options for a lot of diseases with a single product, with little chance for resistance. The elimination of these compounds may be partly responsible for the surge in fairy ring problems on golf courses over time as well.

The discontinued use of all of these products for the betterment of the environment was a positive step for golf courses, but it is likely that side effects of some of those products helped to control non-target problems. The removal of those products from the market is one factor in the emergence of some of the problems that we are now experiencing.

## IRRIGATION PRACTICES

Wall-to-wall irrigation coverage on golf courses is becoming more of a standard than a luxury. Frequency of irrigation has increased on most golf courses in the past 20 years. Irrigation of the near rough and green surrounds is considered a must on many golf courses. Increased irrigation has improved the appearance of fine turf areas, but could our penchant for green turf, in combination with firm, fast conditions, be contributing to some of the persistent problems that are being experienced at certain times during the growing season?

Cool, moist soil conditions certainly encourage earthworms and provide a perfect environment for casting activity. Irrigation prolongs these conditions for earthworm development. Our irrigation practices may also encourage other problems such as fairy ring and LDS.

Fairy rings take on various appearances in turf. Sometimes, only superficial symptoms are expressed as a dark green ring of turf. This is caused by nitrogen release during the breakdown of organic matter as the fungus develops. Sometimes, the rings are only annoying aesthetically. Other times, the turfgrass at the edge of the ring declines because of excessive nitrate release under high temperatures. More commonly, water repellent soils develop and create drought stress on the turf around the rings.



The basidiomycete fungus that is the main cause of fairy ring thrives under moist conditions, as do most fungi. Many golf courses irrigate turf on a frequent basis, and this maintains an environment in the upper portion of the soil profile that aids in development of fairy ring and other diseases. Massive fairy ring development has been noted after heavy rain, again pointing to the importance of water in development of this problem. Under dry weather conditions, irrigation inputs keep the grass green but are not adequate to prevent wilt stress from occurring in the turf as a result of fairy ring.

Deep, infrequent irrigation is often the goal of irrigation cycles, and this provides benefits in terms of playability and disease prevention. Irri-

Severe fairy ring can kill grass in spite of fungicide applications. Killer fairy ring has been more common in recent years, possibly fueled by irrigation and other management practices that encourage its development over time.



gation is applied heavily to thoroughly wet the soil, and the soil is then allowed to dry down before additional irrigation water is applied. Unfortunately, research suggests that LDS is encouraged partly by repeated wetting and drying cycles. With each drying cycle of the soil, organic acids coat soil particles and this eventually leads to hydrophobic conditions. Again, some of our accepted management practices may have some unintended consequences when they are implemented as the season progresses.

### GOLFER EXPECTATIONS

The common denominator that brings together all of the above issues is golfer expectations. The goal of any turfgrass management program is to meet the expectations of golfers while maintaining aesthetically pleasing surfaces. Golfer expectations are as high as they have ever been, and this is not a complaint or an excuse; it's a fact. It may come as a surprise to some that many of the maintenance programs that are used on golf courses are a compromise between keeping the turfgrass alive and providing the conditions that golfers expect and demand. Changes in irrigation practices mentioned above are directly

related to expectations, and there are other logical relationships between golfer expectations and the emergence of many turfgrass maintenance problems.

Most golfers agree that the appearance and playability of golf courses are more uniform and consistent than they were in the past. Thus, when blemishes do occur, regardless of the cause of the problem, they are more noticeable. When problems are noticed, solutions to cure them are sought. Some of these problems may have been ignored or tolerated in the past, but not anymore. At the same time, these problems are often at their worst at the times of the growing season when the turf is least able to tolerate additional stress. Consider that five percent turf loss spread around a putting green would yield a surface considered unplayable by the modern golfer. This simply indicates the level of quality maintained today.

Low mowing heights also are a contributing factor, causing great physiological stress on the turf. With less leaf tissue, photosynthetic capacity and thus recuperative potential is reduced. Higher-cut turf can mask problems that are so noticeable in fine turf areas. For example, ants and earthworms live in golf course rough just as

Earthworm casts create challenges for mowing and playing quality. Heavy earthworm casting can turn fairways to mud in a matter of days. Peak casting activity in spring and fall also coincides with peak golfer activity, which highlights the damage that occurs and the frustration that comes with it.







happily as they do in tees and fairways. However, ant mounds and worm casts have little impact in 3-inch Kentucky bluegrass rough compared to creeping bentgrass fairways mowed below one-half inch.

Nitrogen fertilizer rates often are kept low in an effort to promote green speed, which makes the grass more susceptible to diseases such as anthracnose. Water is withheld to produce firmer conditions, but doing so may further stress the grass. Greens are mowed and rolled more frequently, placing additional mechanical stress on the turfgrass. The decline of collars that is frequently experienced during the summer months is directly related to traffic intensity from equipment used to prepare greens for daily play.

These practices can jeopardize turfgrass health at any time of the year, but they are especially damaging when environmental stresses are high. Sometimes, brown grass provides excellent playability, but there is an expectation for golf course presentation that often overrides playability. This desire for green turf is often in direct conflict with playability goals set forth by green committees and course officials. Firm, fast, and green are difficult to achieve, especially during the most stressful portions of the growing season. The result is turfgrass that is under tremendous physiological stress; that is less able to resist disease, insects, etc.; and that is less able to recover from damage that occurs. The closer the grass is to "the edge," the more susceptible it will

be to pathogens that may not otherwise be a problem. Interestingly, some of these problems that are a major issue on very intensely managed golf courses are nothing more than a passing interest on lower-maintenance golf courses that do not have the resources to push grasses to their limits. Expectations are lower at these facilities, and with the exception of problems on putting greens, problems with LDS, earthworms, fairy rings, etc. are ignored or at least accepted.

No single factor is to blame for the emergence of old problems and the development of new ones as major management challenges. The loss of certain pest control chemistries has affected control of diseases, insects, and other organisms, such as earthworms, and has challenged the resourcefulness of superintendents and agronomists to develop solutions. The level of maintenance provided on golf courses, especially as it relates to irrigation, has allowed better turfgrass quality to be maintained, but it may also provide a better environment for some emerging problems to persist. For sure, golfer expectations have created a heightened awareness of certain issues on fine turf areas. Maintenance challenges of one kind or another have always existed on golf courses, and we must continue to develop strategies to meet these challenges and keep up with the ever-changing expectations of golfers.

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As height of cut has been reduced on fine turf areas, problems such as nuisance ant mounds are all the more noticeable in terms of playability. They cause more injury to the turf because lower-cut turf is easily smothered by ant mounds.