Golf Stop 8

Management of Putting Greens Under Shade

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One of the most difficult challenges facing golf course superintendents today is maintaining turfgrass under shaded conditions, especially on putting greens. With the support of the Michigan turfgrass industry, the Michigan State University turf team has launched a shade research project aimed at: 1) understanding the physiological effects of reduced light on the turfgrass plant; and 2) developing management strategies to successfully grow turf under shade. In the future, we expect that our program will interface with a turfgrass breeding program in order to develop and release turfgrass cultivars with improved shade tolerance. Initially, our research will focus on putting green turf; however, our findings can and will be connected to other turf shade problems.

In 1998, we initiated several projects to study the effects of shade on turfgrass. These experiments are complemented by the ongoing dome stadia research under the direction of Trey Rogers. This spring, we transplanted 20 maple trees (6-inch caliper, 20-25 ft tall) from the Horticulture Farm to the Hancock Turfgrass Research Center (HTRC). The trees were planted in two rows from north to south. Adjacent to both rows of trees we have constructed putting greens using a USGA greensmix. The design of the greens will allow us to test the effects of morning vs. afternoon shade on putting green turfgrass growth. Initially, we will examine photoperiod effects on Penncross, Providence, L-93, A-4, G-2, and the recently released cultivar of annual bluegrass.

This fall we will establish the 1998 National Fine Fescue Ancillary Test under rows of dense shade trees at a location southeast of the HTRC. In addition, David Gilstrap planted several green ash whips south of the HTRC in order to conduct similar types of lawn shade experiments in the future.

The study that you will observe today was designed in order to develop effective management strategies for putting green turf under shade. Shaded turfgrass plants do poorly in part due to the plantís natural instinct to ëgrow out of the shade.í Thus, the shaded plant spends most of its energy on vertical growth while depleting its carbohydrate reserves. This growth response produces plants with weak and spindly leaves. As exposure to low light continues, carbohydrate reserves are further depleted, and turf quality declines perhaps even to the point of death.

It is recognized that bentgrass greens do not perform well in shaded environments, especially in high traffic areas. Previous research conducted at MSU under the dome showed that quality of Kentucky bluegrass was increased using the plant growth regulator trinexapac-ethyl (Primo) and a higher level of nitrogen. It is hoped that these practices could provide similar benefits to putting green turf under shade. In theory, the turfgrass plant will maintain more of its morphology that is observed in direct sunlight using Primo. The additional nitrogen may help maintain a better physiological balance of carbohydrates and other important plant constituents.

In July, two shade houses were erected on Penncross creeping bentgrass at the HTRC. The putting green is mowed six times/week at 0.140 inches. The black shade cloth was woven to intercept 80% of incident light from striking the turf below. In August, the initial treatments were applied to turf grown in the shade houses and in direct sunlight. Primo was applied at rates of 0, 0.075, and 0.125 fl. oz/1000 ft2. Sequential applications of Primo will be based on plant health and clipping yield. Nitrogen will be applied at rates of 2.5 and 5.0 lbs/1000 ft2/growing season. The treatments are combined in a factorial arrangement. Measurements of light intensity and quality, relative humidity, wind speed, and soil and air temperature are monitored hourly both inside and outside of

the shade house. In addition, these measurements will be compared with those taken under actual shade conditions on a putting green at the CC of Lansing. Turf will be evaluated for quality, color, clipping yield, shoot density, root mass, carbohydrate partitioning, ball roll, and disease susceptibility. Shade cloth will be removed in the fall in conjunction with leaf drop and erected again in spring with full leaf expansion.

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