

# Sunlight Needs for Ultradwarf Putting Greens

***By Patrick O'Brien and Chris Hartwiger, USGA SE Region Agronomists***

Many inquiries arrive daily on the issue of sunlight for ultradwarf putting greens these days. The main reason is that numerous golf courses in the SE Region with bentgrass putting greens are pondering whether to change to an ultradwarf. Superintendents are inquiring whether they have enough sunlight at each putting green site to accommodate an ultradwarf or if additional tree removal work is needed. Our usual response has been to suggest 5 hours of morning sunlight and 5 hours of afternoon sunlight for an ultradwarf putting green based on our experiences.

We decided to pose this inquiry to Dr. Robert Carrow, Plant Physiologist at the University of Georgia – Griffin Station. We asked Dr. Carrow if he has any base guidelines on the differences in sunlight requirements for a bentgrass versus an ultradwarf putting green. Here is the response of Dr. Carrow on this important question:

Regarding the hours of sunlight required for bermudagrass. Our study on seashore paspalum with 5 hours morning shade or 5 hours afternoon shade versus full sunlight, where the shade level was about 90% for the 5 hour periods, the results were and which I believe would fit bermudagrass:

- When no traffic was imposed, both morning and afternoon shade caused some decline in turf quality and density but the differences were not great. With an ultradwarf bermudagrass, I would expect somewhat more deterioration. Jiang et al., 2003. HortScience 38(6): 1218-1222.
- When traffic by our wear device (two rubber rollers that run at different speeds and cause tearing, abrasion, and pressure; it was the same device we used determining species and cultivar wear tolerances and differences and it has worked very well) was applied to the light treatments, there was considerably more damage apparent to the wear plots under both morning and afternoon shade relative to full sun than when no traffic was present. The point is that there is a substantial light-wear interaction. Grasses may look relatively good under these light treatments if no traffic is applied. However, when traffic is applied, the shaded plots deteriorated rapidly.

Thus, golf courses with high play or limited cupping areas where traffic concentrates in areas of a putting green receiving shade would exhibit greater injury and they would need better sunlight conditions. Hole location placement

may need to be changed more often and shaded areas avoided as much as possible. Walk mowers would likely be best.

- When comparing the morning versus afternoon shade, differences were apparent under the wear treatment but not in non-traffic treatments. Those plots receiving morning shade (i.e. afternoon sunlight) exhibited less detrimental influence on quality, shoot density, NDVI (stress indice), and color. I believe in this case that the morning plots were better because they received more light in the afternoon for photosynthesis and could produce more carbohydrates for tissue maintenance and recovery.

The suggestion of requiring at least 5 hours morning and 5 hours afternoon sunlight seems reasonable to me as a minimum condition. Light in the morning helps to get dew off and could help in disease management, while afternoon light favors photosynthesis. However, at morning shaded sites dew removal can be done by hand or light syringing. Photosynthesis appears to be relatively limited until about 11 AM due to stomatal closure and lower light levels. Thus, the more hours of sunlight after 11 AM the better.

These guidelines would likely be applicable to all locations except ones with frequent cloudy or overcast days or weather patterns that sometimes cause these conditions. In those cases the more sunlight the better or if this is a common condition perhaps bermudagrass is not the answer.

Sunlight quality is more important than duration but on putting greens and fairways we are normally dealing with conditions of the turfgrass not directly under the tree but sunlight being shaded by a tree at somewhat more distance away. Sunlight quality is still affected but to a somewhat less extent than directly under the tree since more distance shaded turf receives diffuse light that may be reflected and have somewhat better quality. With that said, since we are dealing with a common diffuse light situation, the observations of turfgrass performance on putting greens of duration of light is under these conditions so we essentially use duration as a measure of the amount of light needed. Removal of trees and plants that cause shade is the only means of increasing light quality and duration.

Thanks Dr. Carrow for your response.

Source: Patrick O'Brien 770-229-8125 or [patobrien@usga.org](mailto:patobrien@usga.org) and Chris Hartwiger 205-444-5079 or [chartwiger@usga.org](mailto:chartwiger@usga.org)