PHOTOSYNTHETIC LIGHT RESPONSE CURVES FOR DIFFERENT BERMUDAGRASS CULTIVARS

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ABSTRACT

Bermudagrass (Cynodon dactylon L.) is grown in the southwestern United States for use as turfgrass on golf courses, athletic fields, home and commercial lawns, and general turf areas. This study was undertaken to determine the photosynthetic light response curves for 12 different cultivars of bermudagrass with a view to understanding the environmental range of these cultivars. The cultivars were: Arizona common, Cheyenne, Guymon, Midfield, Midlawn, Midiron, Tifgreen, Tifway 1,Sahara, Sandevil, Sonesta, and Texturf 10. Bermudagrass was grown in 80:20 (v/v), sand peat mix in 20 L containers. Photosynthetic rate was measured with an open-flow gas exchange system. Light intensity ranged from 100 to 600 mol m^{-2} s^{-1}. Net photosynthetic rates were curve fitted using both exponential and Michaelis-Menten type equations. Where photosynthesis was saturated, the equations give similar results. Unfortunately, the highest light intensities tested did not saturate photosynthesis for most cultivars. Under these conditions, the exponential equation gave a better fit. It does appear, that Midfield and Arizona common have lower maximum photosynthetic rates than the other cultivars which may suggest some shade tolerance. In addition to maximum photosynthetic rate, dark respiration, light saturation, compensation irradiance, photochemical efficiency and PAR offset were determined. While these parameters varied among cultivars, there were no obvious trends. The most important parameter to optimize curve fitting appeared to be PAR offset. Further study will be required to make quantitative recommendations on cultivar selection for varying light conditions.