The effects of exogenous fructose on various turfgrasses under shaded conditions

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Shaded environments present major obstacles for establishing and maintaining high quality, persistent and resistant turfs. Exogenous fructose applications to turf have shown some promise for improving turfgrass quality under shade (Sorochan, 2002). This research examines turf quality and physiological relationships between light levels, temperatures, and exogenous fructose treatments. This research tests the hypothesis that fructose applications improve turfgrass quality under shaded conditions.

Experiment I was conducted at Michigan State University, East Lansing, Michigan inside a simulated dome environment that examines two fine leaf fescue cultivars: chewings fescue *(*CF *Festuca rubra v. commutata)* 'SR5100' and creeping red fescue (CRF *Festuca rubra v. rubra*) 'Dawson'. The experiment was a RCB design with two factors: light and fructose. There were three light treatments: ambient light (shaded), supplemental high light, and supplemental low light. Fructose (0 or 1.25% weight/volume) was dissolved in water with an organosilicone adjuvant was applied once per week. Quality ratings and clippings were recorded. In addition, experiment II examined light response curves (LRC) taken inside an Econoair® growth chamber on MSU campus using a LICOR-6400® on the fine fescues, Kentucky bluegrass (KB *Poa pratensis*) 'Cynthia', and Bermudagrass (BG *Cyondon dactylon*) 'Princess'.

Results for experiment I, clipping weights and quality ratings, indicated that ambient light did not provide an optimum growing environment for CF and CRF with or without fructose, and there was no significant difference between fructose and control within the cultivars and the lighting treatments. Supplemental high and low light increased overall quality and clipping weight of cultivars grown under shaded conditions, with or without exogenous fructose.

Results for experiment II, LRC, indicated assimilation (A) increased in all cultivars when fructose was applied under optimum and suboptimum regimes except under seven days after 20°C. Plants after seven days at 20°C with fructose with lower A rates suggests that fructose was utilized within first 1 hour of application. Stimulation of assimilation with fructose suggests: exogenous fructose did not provide feedback inhibition, fructose goes into storage, and may provide more substrate to "fuel" assimilation.

In conclusion, from dry weight data, it appeared that elevated assimilation did not supply sufficient dry weight accumulation to maintain growth, but may have gone entirely to respiratory sinks. Future investigations will examine how much fructose is needed under shade at optimum and suboptimum temperatures.