

Athletic Field Paint Effects on Turfgrass Photosynthesis and Transpiration

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Objectives: To determine the effects of athletic field paint on turfgrass growth processes including photosynthesis and transpiration.

Transpiration Experiments

Field Lysimeters

18 native soil and 18 fritted clay lysimeters have been constructed for transpiration research at the NCSU Turfgrass Field Lab.

Planned comparisons

- 1.) Painted versus non-painted turf
- 2.) Bulk paint versus aerosol paint
- 3.) Various colors of paint
- 4.) Various rates of paint
- 5.) Single application effects v/s season-long effects

Methodology

Lysimeters will be saturated and allowed to drain to field capacity prior to being plugged and weighed. Various paint treatments can then be applied for re-weighing every 24 hours. Any observed decrease in weight is due to transpirational losses from each pot which can be compared for paint effects.



<u>Color</u>	<u>Wavelength</u>
<u>violet</u>	380–450 nm
<u>blue</u>	450–495 nm
<u>green</u>	495–570 nm
<u>yellow</u>	570–590 nm
<u>orange</u>	590–620 nm
<u>red</u>	620–750 nm

- Photosynthetically Active Range (PAR) is 400-700 nm.
- For crop canopies, reflection is low near the 480 and 680 nm region due to the high absorbance by chlorophyll.

Photosynthesis Experiments

Experimental Units

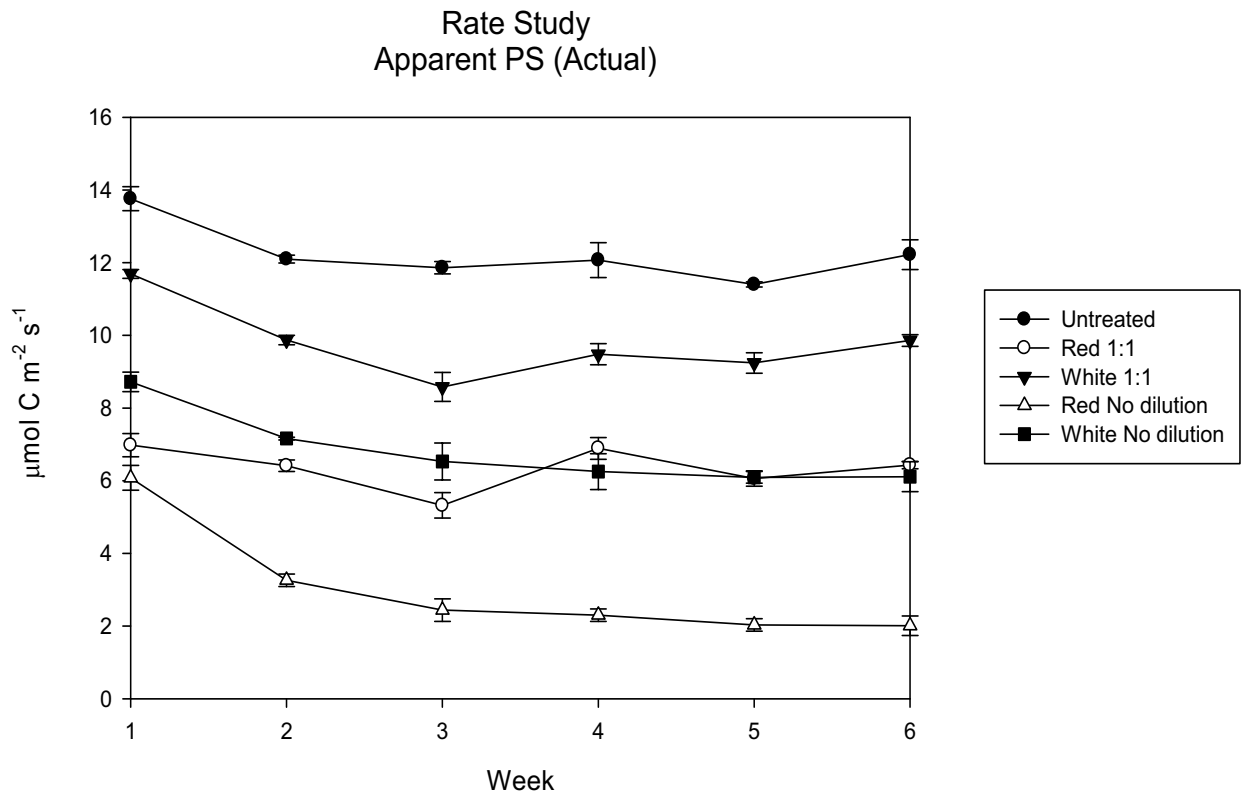
Bermudagrass alone and bermudagrass overseeded with Perennial ryegrass.

Planned comparisons

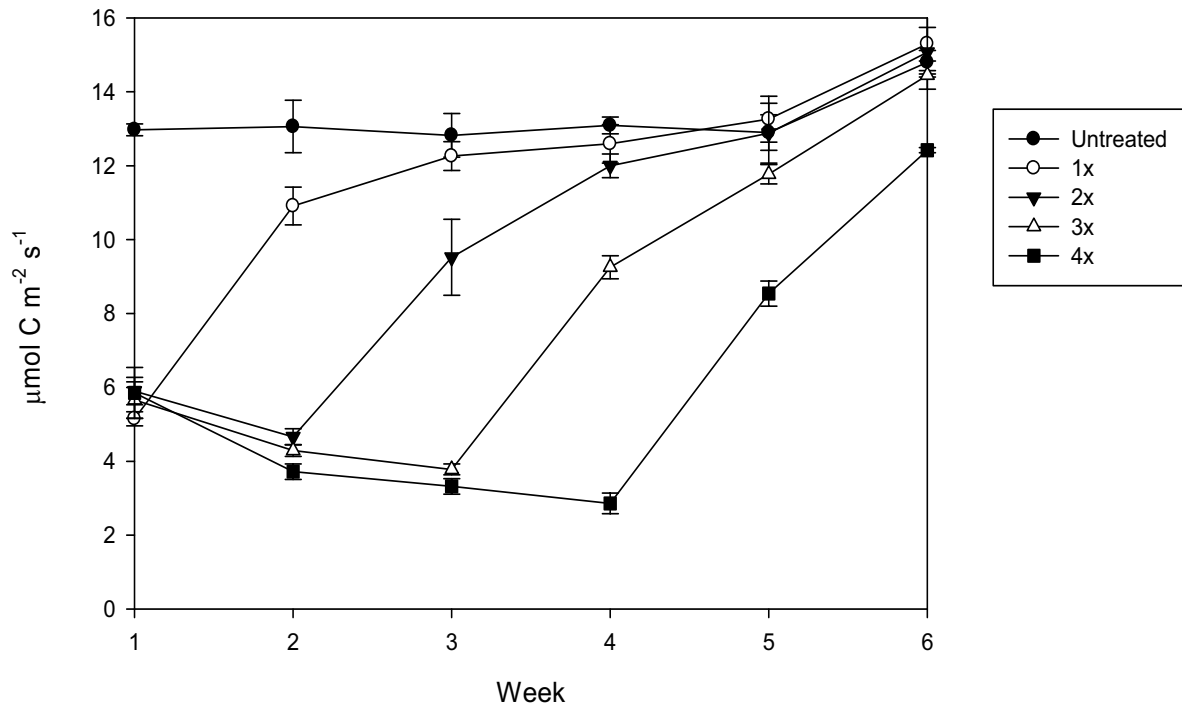
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Methodology

- Two Phytotron trials are currently being conducted to evaluate the effects of red and white paint on perennial ryegrass.
 - o Rate study: Red and white paint at two dilutions (non-diluted and 1:1 dilution) are being applied weekly.
 - o Stair step study: Red, non-diluted paint is being applied weekly at a frequency of 1x, 2x, 3x, and 4x applications.
- Photosynthesis is being measured after each weekly application using a LICOR 6400 to document reductions in photosynthesis.



Stairstep Study Apparent PS (Actual)



Future planned experiments

- ACC School Colors Trial
 - o Which colors are most and least damaging to turfgrass?
- Paint entry into plants
 - o Does paint actually enter the plant or are all damages superficial?
- Carbohydrate production and accumulation
 - o Does paint affect the plant's ability to sequester carbon and store carbohydrates?
- Others???

Questions or comments:

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