Southern Illinois University Edwardsville

Thermal Benefits

Dave Richey, Lane Richter, Abby Wackerly

PHASE II

Figure 7. Built-in-place green roof models with thermal probes at the SIUE Environmental Sciences Field Site.

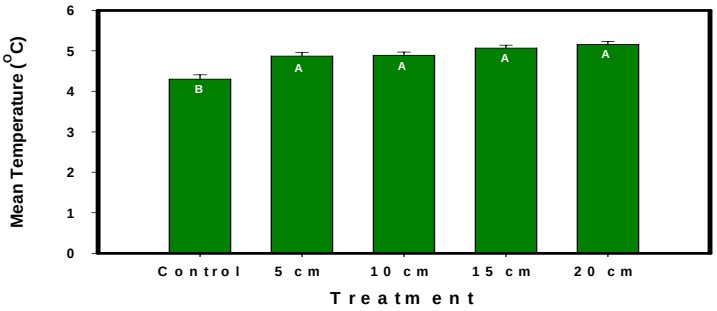


Figure 8. Mean monthly roof membrane temperatures from a control roof and planted built-in-place green roof systems containing 5, 10, 15, and 20 cm of growing medium. Values represent data collected at 15 minute intervals in each green roof or control roof system during the month of January, 2006. Bars with different letters are significantly different (α<0.05). Error bars represent +1se. (n=2976)

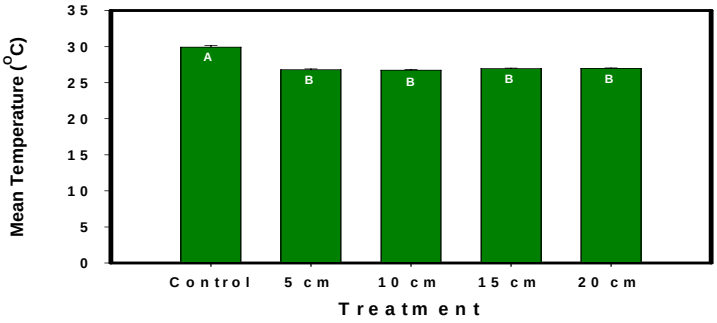


Figure 9. Mean monthly roof membrane temperatures from a control roof and planted built-in-place green roof systems containing 5, 10, 15, and 20 cm of growing medium. Values represent data collected at 15 minute intervals in each green roof or control roof system during the month of August, 2006. Bars with different letters are significantly different (α<0.05). Error bars represent +1se. (n=2977)

CONCLUSIONS – Thermal Benefits

1) The thermal benefits of green roof models at the ground-level field site compared to a standard control roof membrane in cold and hot months were quantifiable.
2) Green roofs reduced the temperature of the roof membrane in hot months and increased the temperature of the roof membrane in cold months. In both cases, the temperature of the roof membrane under a green roof system is less variable than the roof membrane of a standard roof.

Recommendation: Over time, the characteristics of green roofs that will contribute to their thermal effectiveness—both for reducing the heat island effect and for reducing energy demand—can be characterized.

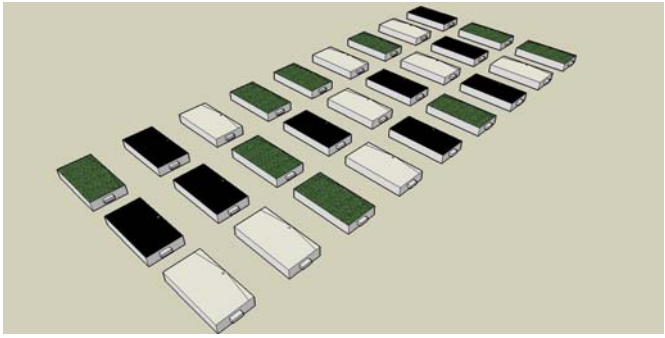
Our Phase II project will have the following objectives:

1) Developing a model of the thermal effects and determining the insulation value (R value) of green roofs.

2) Continuing runoff water quality (both N and P) analysis.

3) Expanding our efforts from flat green roofs to sloped green roof applications.

Figure 10. Prototype sloped green roof systems – testing to begin in 2007.



Our ultimate objective with our green roof partners is to develop plans for the construction of a twenty-seven unit scale-model building G.R.E.E.N. energy research campus to evaluate energy conservation and storm water retention of reflective and green roof systems.

P3 award

SIUe