

# G.R.E.E.N. (Green Roof Environmental Evaluation Network)

A St. Louis metropolitan area research collaboration (G.R.E.E.N. – Green Roof Environmental Evaluation Network) between Southern Illinois University Edwardsville (SIUE), Green Roof Blocks™, Jost Greenhouses, Midwest Groundcovers, Midwest Trading Horticultural Supplies, Inc., JDR Enterprises, Inc., Emory Knoll Farms, Garick, Inc., and greenroofs.com has been established to evaluate the performance of green roof technology in the Midwestern United States. Faculty, Student Researchers, and Collaborators are working together to evaluate green roof performance and green roof technology and to make the information available to users for development/establishment of green roofs.

## Diagnosing Plant Performance and Evaluating Growth Medium



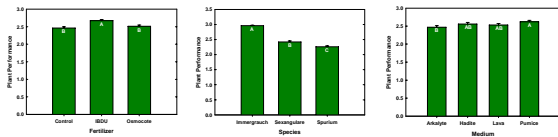
In the spring after the first winter of exposure on our research green roof, we observed that we had 100% mortality of *Sedum hybridum immergrauch* and this effect was observed at a commercial green roof at Carnegie-Mellon University. We determined that shading (100% shading on our roof) was causing the mortality.



We now recommend multi-species installations (see Carnegie-Mellon after replanting – above). Further, we have evaluated a shade-tolerant *Sedum ternatum* with 100% survival so far in full shade during the growing season.



In July 2005, our first research green roof project was established on the Engineering Building at SIUE. In the first week of August, we observed fertilizer injury in some species after a 0.2 mm rainfall event during a very hot period. Similar symptoms were also observed at University Missouri-Columbia and University of Georgia installations. As a result, we established a research trial of four different growing mediums, three *Sedum* species, and three fertilizer treatments (water- and heat-released fertilizers and control – no fertilizer).



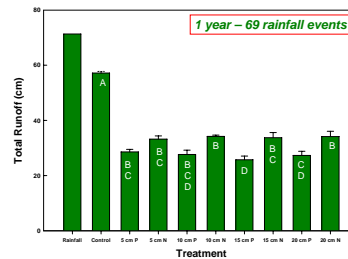
After 10 weeks plants receiving IBDU fertilizer had the greatest performance value, *Sedum hybridum immergrauch* had the greatest performance value, and sedums growing in pumice growing medium had the greatest performance.



There are now SIX research projects on the SIUE Engineering Building.

- 1 – the original plant evaluations
- 2 – the plant species/fertilizer/growing medium experiment
- 3 – Green Paks™ with two planting densities, five species, and five growing mediums
- 4 – a water loss experiment in which individual green roof systems are weighed following each rainfall and during drying periods
- 5 – the shade tolerance experiment
- 6 – thermal evaluations in two projects

## Field Site – Storm Water Evaluations



We have confirmed that green roof models with plants retain more storm water than green roof models without plants. In the first year, sixty-four percent of storm water was retained by the 15 centimeter green roof models with plants (our best system). However, we have documented possible storm water quality issues in green roof systems – we are addressing this with ongoing evaluations.

[www.green-siue.com](http://www.green-siue.com)

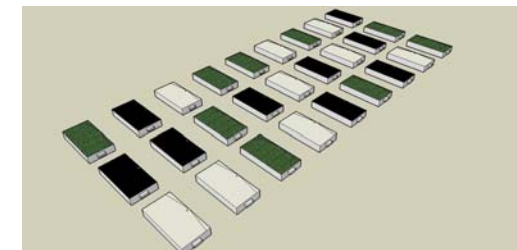
[www.greenroofs.com](http://www.greenroofs.com)

Faculty Members of G.R.E.E.N. include:  
 Dr. Bill Retzlaff – SIUE Environmental Sciences Program (Coordinator)  
 Dr. Susan Morgan – SIUE Civil Engineering  
 Dr. Terry Yan – SIUE Mechanical and Industrial Engineering

Industry Members of G.R.E.E.N. include:  
 Mr. Kelly Luckett – Green Roof Blocks™, St. Louis Metalworks Co.  
 Mr. Vic Jost – Jost Greenhouses  
 Ms. Grace Koehler – Midwest Groundcovers  
 Mr. Michael Curry – Midwest Trading Horticultural Supplies, Inc.  
 Ms. Janet Faust – JDR Enterprises, Inc.  
 Ms. Linda Velazquez – greenroofs.com  
 Mr. Doug Burry – Garick, Inc.  
 Mr. Ed Snodgrass – Emory Knoll Farms

Graduate Student Members of G.R.E.E.N. include:  
 Mrs. Krista Forrester – SIUE Environmental Sciences Graduate Student  
 Mrs. Sam Kaufman – SIUE Environmental Sciences Graduate Student  
 Ms. Julie Gibbs – SIUE Environmental Sciences Graduate Student  
 Mr. Harry Lucas – SIUE Environmental Sciences Graduate Student  
 Ms. Debbie Gaffney – SIUE Environmental Sciences Graduate Student  
 Ms. Emily Woods – SIUE Environmental Sciences Graduate Student  
 Ms. Abby Wackerly – SIUE Environmental Sciences Graduate Student  
 Ms. Lauren Swearingin – SIUE Environmental Sciences Graduate Student

Undergraduate Student Members of G.R.E.E.N. include:  
 Mr. Dave Richey – SIUE Chemistry Undergraduate Student  
 Mr. Lane Richter – SIUE Biological Sciences Undergraduate Student  
 Mr. Joe Gibbons – SIUE Biological Sciences Undergraduate Student  
 Ms. Mariellen Sydow – SIUE Biological Sciences Undergraduate Student  
 Ms. Heather Luckie – SIUE Liberal Studies Undergraduate Student  
 Ms. Crystal Hise – SIUE Biological Sciences Undergraduate Student



Our next objective with our green roof partners and newly formed partnerships is to construct a twenty-seven 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.

**Our goal is to evaluate the performance of green roof technology and to make the information available to users for development/establishment of green roofs.**