

S44 - Impact of Sedum and Grass on Green Roof Albedo and Sensible Heat Flux



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6:30 PM - 8:30 PM



Hall C (New Orleans Ernest N. Morial Convention Center)

Abstract

New policies requiring green roofs have begun to be implemented all through the country due to increased environmental consciousness along with attempting to mitigate common urban issues such as stormwater runoff and rising temperatures due to the Urban Heat Island (UHI) phenomenon, whereby urban areas tend to have increased temperature when compared to their surroundings due to lack of vegetation and high heat retention. These policies raise the question of which vegetation species is best suited for green roofs in order to maximize the cooling potential.

The focus of this study was how changes in albedo (the proportion of incoming radiation that is reflected off of a body) and sensible heat flux (the heat transfer that causes a change in temperature without a change in phase) across green roof cover types contribute to overall cooling. This study explored the relationship between albedo, sensible heat flux, and overall energy balance by comparing the performance between two different vegetation types on irrigated green roof trays in Portland, Oregon. The two vegetation types are *Bouteloua dactyloides*, a warm season C4 grass, and *Sedum album*, a CAM succulent, alongside the control, a pure growing medium.

Data were collected on different days and times to obtain a variety of samples for a more accurate representation of changing weather conditions. Three trays were set up for each vegetation type and one control, where the upwards-facing pyranometer (SP-510) and lower-facing pyranometer (SP-610) were used to determine the albedo for each tray as together the SP-510 and SP-610 form an albedometer. The outgoing shortwave radiation from the SP-610 was divided by the incoming shortwave radiation measured by the SP-510 to obtain the albedo value, α . Calculations for sensible heat flux were created and analyzed from the data collection as surface and air temperature were concomitantly recorded. The results reveal differences between the two species and their performance on green roofs. The results for the albedo show a significant difference according to the value found from doing a single factor ANOVA test resulting in a p-value calculated to be 4.9E-06. The measured sensible heat flux also showed a large difference between the vegetated treatments and the control. While the differences between the grass and

sedum treatments appeared small, rapidly changing climate conditions made a consistent comparison challenging.

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