

Recent Research in the Fullerton Arboretum

<http://bioweb.biology.utah.edu/pataki/>

2014, Elizaveta Litvak, Neeta Bijoor, Diane Pataki, assessed the contribution of turfgrass and the role of tree shading in evapotranspiration of irrigated landscapes in the Los Angeles region. The Fullerton Arboretum managed lawn was one of the eight chosen lawns for this study. They used portable chamber measurements and empirical modelling to estimate irrigated turfgrass evapotranspiration and analyze its variability and environmental control. It was concluded that reductions in turfgrass evapotranspiration caused by shading effects of open-grown trees were more important in influencing total landscape evapotranspiration than the addition of tree transpiration. This suggests that low-density planting of trees that partially shade irrigated urban lawns may be a water-saving measure in semi-arid irrigated environments.

Litvak E, Bijoor NS, Pataki DE. 2014. Adding trees to irrigated turfgrass lawns may be a water-saving measure in semi-arid environments. *Ecohydrology*, In press (DOI: 10.1002/eco.1458)

2012, Elizaveta Litvak, Heatehr McCarthy, Diane Pataki, studied stomatal responses to pressure deficit in irrigated trees in the urban landscape of Los Angeles, California. In 2008, sap flux data from the grove of irrigated coast redwood (*Sequoia sempervirens*) from the Fullerton Arboretum was collected and compared to seven other sites. The study confirms systematic differences in water relations in ring-versus diffuse-porous species, but these differences appear to be more strongly related to the relationship between stomatal sensitivity to pressure deficit and vulnerability to cavitation rather than to stomatal sensitivity per se.

Litvak E, McCarthy HR, Pataki DE. 2012. Transpiration from urban trees in a semi-arid climate is constrained by xylem vulnerability to cavitation. *Tree Physiology* 32: 373-388.

2011, Elizaveta Litvak, Heatehr McCarthy, Diane Pataki, investigated the water relations of coast redwood (*Sequoia Sempervirens*) planted in the urbanized semi-arid Los Angeles Basin, where it often experiences leaf chlorosis and senescence. Coast redwoods from the Fullerton Arboretum represented one of the three sites of the irrigated, urban trees that were used for this experiment. It was concluded that water stress was not a direct factor in causing leaf chlorosis and senescence as has been proposed. Instead, the relatively strong stomatal control that is adaptive in the native habitat of coast redwood may lead to carbon limitation and other stresses in semi-arid, irrigated habitats.

Litvak E, McCarthy HR, Pataki DE. 2011. Water relations of coast redwood planted in the semi-arid climate of southern California. *Plant, Cell and Environment*, 34(8): 1384-1400.

2013, Miguel Macias, Darren Sandquist (CSUF), and David Bedford, David Miller (USGS), conducted an experiment to quantify road disturbances in the Mojave Desert. Sap-flow gauges were used on Creosote Bush (*Larrea tridentate*) to provide automated and efficient long-term measurements after simulating rain events at three sites on the foot of the Providence Mountains in the Mojave Desert. Miguel Macias is currently collecting stem samples from the Fullerton Arboretum to calibrate the sap-flow gauges and determined the accuracy of the home-made device.

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