Environmental Engineering and Management Journal xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
http://omicron.ch.tuiasi.ro/EEMJ/

"Gheorghe Asachi" Technical University of Iasi, Romania

THE RELATIONSHIP BETWEEN GROWTH PREDICTION AND SOIL SURFACE FOR THREE URBAN TREE SPECIES IN ROMANIA

Oana Pohoață Lupu *, Lucia Draghia

„Ion Ionescu de la Brad" University of Agricultural Sciences and Veterinary Medicine of Iași, Faculty of Horticulture, 3 Mihail Sadoveanu Alley, Iași, 700490, Romania

Abstract

The human population is increasingly disconnected from nature due to urbanization. Modeling the environmental benefits of urban trees requires data which correlate stem diameter, height and crown diameter to tree age. Growing capacity, vitality, and lifespan of trees are influenced by the soil surfaces (*BS*) available for roots. In this study, we used allometric modeling to identify the regression functions and growing patterns of the three most important tree species in the Iași area, Romania. We obtained the site constant (*Ks*) in order to calculate the soil surface (*BS*) for each species. Regressions were applied to relate soil surface (*BS*) correlated with estimated age (years after planting), diameter at breast height (*DBH*), tree height (*H*), and crown diameter (*CD*). The statistical analysis identified the best-fitting models for each species and parameter. Across all three species each allometric relationship was statistically significant ($p < 0.001$) at an alpha level of 0.05. Allometric relationships can be used to develop spacing guidelines for commonly planted urban trees. The dimension of soil surface available in urban infrastructure offers the solutions for selecting the appropriate tree species and location for the planting program. The paper can also be a guide for the *BS* calculation for other species, since the site constant (*Ks*) is known and the other parameters can be measured easily in the field. These correlations will help arborists and tree managers to predict the growth and the long-term health of urban trees, thereby improving the management and maintenance of city's urban landscape.

Key words: allometric models, predictive patterns, tree growth, soil surface

Received: October, 2014; Revised final: March, 2015; Accepted: April, 2015

*Author to whom all correspondence should be addressed: e-mail: lupu_oana2007@yahoo.com; Phone: +40 0745 313858