

ARBORICULTURAL ABSTRACTS

CONTRASTING BELOW- AND ABOVEGROUND RESPONSES OF TWO DECIDUOUS TREES TO PATCHY NITRATE AVAILABILITY

Vit Gloser, Katherine Libera, and Colin M. Orians

We investigated how patchy nitrate availability influences growth and functioning of plant roots and generates, through vascular constraints on long-distance transport, aboveground heterogeneity in plant growth and chemistry. We examined two broadleaf tree species, *Acer rubrum* L. and *Betula papyrifera* Marsh. Plants were grown either in a split-root setup where a single root received full nutrient supply and the rest of the root system received all nutrients except nitrogen (patchy treatment), or in a single pot with full nutrient supply (homogeneous treatment). In both species, fine roots proliferated in the nitrogen patch, but *B. papyrifera* produced twice as much fine root biomass in response to patchy nitrate availability as did *A. rubrum*. There was no difference between treatments in nitrogen uptake rate in either species. In general, specific water uptake was higher in *A. rubrum* than in *B. papyrifera*, especially in the nitrogen-rich side pot. When nitrate availability was patchy, nitrate reductase activity in roots and leaves was unaffected in either species. In *A. rubrum*, but not in *B. papyrifera*, patchy nitrate supply resulted in aboveground heterogeneity, with leaves above the N-fertilized roots being larger and having a higher relative chlorophyll concentration than those inserted in the opposite quarter of the stem. (Tree Physiology 2008. 28:37–44)

PATTERN AND DIVERGENCE OF TREE COMMUNITIES IN TAIPEI'S MAIN URBAN GREEN SPACE

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Urban vegetation increasingly contributes to nature conservation and ecosystem services, but lacking understanding of site variations has restricted such uses. This study analyzed the spatial pattern and differentiation of tree communities in three major green landscape types (urban parks, riverside parks and street verges) in Taipei city. In each landscape type, 10 representative tree communities were studied. Statistical tests for ecological communities were employed: Jaccard and Q species similarity indices, two-way indicator species analysis (TWINSPAN), and new species fidelity, landscape fidelity and composite Q indices. Significant recent increase in Taipei's green spaces was traced. The study area contained 164 tree species, but few were shared by the three landscape types and none by 30 communities. Native evergreen broadleaf species with large final dimensions were dominant. Urban parks registered the highest species richness, landscape fidelity, rare species and urban endemics. Such exclusive species constitution deviated notably from riverside parks and street verges, with relatively simple and converging intra-site species ingredients. Pronounced species differentiation between urban parks reflected diversified site topography, natural woodland inheritance, woodland creation, and past landscape fashion. TWINSPAN classified the communities into nine

groups each with signature characteristics. Inherent site variations offered main determinants of tree heterogeneity, superimposed by human modification to satisfy pre-determined site functions. A hybrid urban park with high species diversity and nature contents is advocated by amalgamating conventional but polarized designs of country and urban parks. The findings could inform management of urban forest, urban nature conservation, and ecological services of urban green spaces. (Landscape and Urban Planning 2008. 84(3–4):312–323)

A DOUBLE-HURDLE MODEL OF URBAN GREEN AREAS VALUATION: DEALING WITH ZERO RESPONSES

Salvador del Saz-Salazar and Pau Rausell-Köster

Due to the widespread support for public parks and open spaces in urban areas, there is an increasing need to analyse the social benefits that are generated by such amenities. The city of Valencia (Spain) has a large park that can be considered its green backbone due to its transversal layout running along 9 of the 19 districts into which the city is divided. A contingent valuation survey was therefore conducted in order to obtain the non-market benefits derived from the use of this park by the inhabitants of Valencia. In addition, to deal with the large number of zero responses obtained, a Double-Hurdle model was applied. The results show that this model is more appropriate than other, simpler approaches. They also show that willingness to pay is positively related with the respondent's income and education, as was expected. Another interesting finding is that willingness to pay is also affected by the section of the park in which the interview was conducted. The information gathered from this study is of interest to decision-making with regard environmental issues. (Landscape and Urban Planning 2008. 84(3–4):241–251)

URBANIZATION PRESSURES ON THE NATURAL FORESTS IN TURKEY: AN OVERVIEW

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Forests used to be the main field of interest for rural communities, but now they attract the attention of urbanites too. The forest–public relationship is important as forests protect water resources, preserve the soil and increase its productivity, provide positive effects on climate and health in general, and can be used for recreation and tourist purposes. This study aims at assessing how the current rapid urbanization process in Turkey affects forests. Urban requirements such as biomass for heating, education facilities, settlements, recreation, tourism, and employment exert various pressures on the forest. In this study we assessed these pressures and suggest that forest legislations should be developed to respond to expectations of urbanites from forests, new recreation areas should be developed and urbanites' interest in and knowledge of the forests should be increased, where all

social groups including the forestry authority should work together. (*Urban Forestry and Urban Greening* 2007. 6(2):83–92)

GEOSPATIAL METHODS PROVIDE TIMELY AND COMPREHENSIVE URBAN FOREST INFORMATION

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Urban forests are unique and highly valued resources. However, trees in urban forests are often under greater stress than those in rural or undeveloped areas due to soil compaction, restricted growing spaces, high temperatures, and exposure to air and water pollution. In addition, conditions change more quickly in urban as opposed to rural and undeveloped settings. Subsequently, proactive management of urban forests can be challenging and requires the availability of current and comprehensive information. Geospatial tools, such as, geographic information systems (GIS), global positioning systems (GPS) and remote sensing, work extremely well together for gathering, analyzing, and reporting information. Many urban forest management questions could be quickly and effectively addressed using geospatial methods and tools. The geospatial tools can provide timely and extensive spatial data from which urban forest attributes can be derived, such as land cover, forest structure, species composition and condition, heat island effects, and carbon storage. Emerging geospatial tools that could be adapted for urban forest applications include data fusion, virtual reality, three-dimensional visualization, Internet delivery, modeling, and emergency response. (*Urban Forestry and Urban Greening* 2007. 6(1):15–22)

INCORPORATING BIODIVERSITY ASSETS IN SPATIAL PLANNING: METHODOLOGICAL PROPOSAL AND DEVELOPMENT OF A PLANNING SUPPORT SYSTEM

Davide Geneletti

The information on biodiversity issues that planners have at disposal often offers a very limited support, due to the lack of informative data and suitable planning support systems (PSS). This paper aims at improving the treatment of biodiversity assets in spatial planning by proposing an approach to map and assess biodiversity assets, and by implementing it into a PSS, characterised by ease of use and usefulness. Biodiversity assets were divided into six themes, two of which refer to species (animal and plant species), and the remaining four to ecosystems (forest, agriculture, aquatic, and alpine ecosystems). For each theme, the relevant baseline data were collected and processed, a multicriteria evaluation scheme was set up, and value judgments provided by experts of research institutes and public administration technical offices were sought. The themes were then integrated into a composite map. Factual and value-based information generated during the analysis was organised into a PSS, represented by a Geographic Information System (GIS) platform with a customised querying interface, which allows users to access to thematic layers in a hierarchical fashion, as well as to retrieve relevant background information and reports. The PSS was tested for a specific planning task: the screening stage of Environmental Impact Assessment (EIA). The study area is located in Trentino, an alpine region in northern Italy. (*Landscape and Urban Planning* 2008. 84(3–4):252–265)