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### URBAN FORESTRY



**Ключевые слова:** *городское лесное хозяйство, ландшафтная экология, устойчивое землепользование, городская экология.*

Исследуется образование в сфере городского лесного хозяйства в мире. По результатам исследования автор пришел к выводу, что новые программы и подходы, такие как ландшафтная экология и управление, устойчивое землепользование, городская экология и городское сельское хозяйство, имеют отношение к различным видам землепользования, земельным покровам и экосистемам. Показано, что в России образование в сфере городских лесов не представлено и может быть перспективным.

**Key words:** *urban forestry, landscape ecology, sustainable land use, urban ecology.*

In the article the author investigate the urban forestry education in the world. As the results of the research he conclude that, new programs and approaches such as landscape ecology and management, sustainable land use, urban ecology, and urban agriculture all take a more integrative perspective on different land uses, land covers and ecosystems. Also he found out the in Russia urban forestry education is not presented and can be prospective for development.

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According to Salbitano et al. (2016), all cities share a similar physical texture, comprising “grey” infrastructure (e.g. residential and industrial buildings, roads, utilities and parking lots), blue infrastructure (e.g. rivers, lakes, ponds and water channels) and green infrastructure (e.g. trees, shrubs and grasses in parks, forests, gardens and streets). Optimizing the interactions among these elements is the key to reshaping or building cities capable of responding to urban challenges. Same authors define urban forests can be defined as networks or systems comprising all woodlands, groups of trees, and individual trees located in urban and peri-urban areas; they include, therefore, forests, street trees, trees in parks and gardens, and trees in derelict corners.

The most broadly accepted definition of urban forestry, based on Miller (1997) is ‘the art, science and technology of managing trees and forest resources in and around urban community ecosystems for the physiological, sociological, economic and aesthetic benefits trees provide society’ (Helms, 1998). These natural systems are not limited to parks and green spaces but include trees lining streets and private yards. However, the focus of discussions on

urban forestry revolves around those trees and natural systems on public lands over which the governing jurisdiction can exert direct influence.

Konijnendijk and Randrup (2005) argue that urban forests can be defined as all forest stands and other tree-dominated vegetation in and near urban areas. Benefits of urban forests are multiple (McPherson et al., 2005):

- energy savings based on computer modeling of the effects of shading on heating and cooling costs in buildings;
- the reduction in atmospheric carbon dioxide from both the sequestration of carbon in wood and the reduction in greenhouse gas emissions related to energy savings;
- air-quality improvements due to the collection of pollutants on leaves (but not counting the effect of reduced emissions);
- improvements in aesthetics, as measured by relative increases in property value; and
- reduced storm water runoff, based on average precipitation levels.

This benefits are very important bearing in mind that more than 50% of the world's population lives in cities and suburbs, which are the fastest growing communities in the country.

Pirnat (2001) set a different following functions of the urban forest:

a) Ecological forest functions:

- protection of soils on steep and highly erodible sites;
- hydrological function;
- biodiversity function; and
- climatic function.

b) Social forest functions:

- natural and cultural heritage protection function;
- recreation function;
- aesthetic function;
- educational function; and
- health function.



Fig. 1. Urban forestry in Etobicoke, Toronto. Photo by Sam Javanrouh (<http://www.slocat.net/news/383>).

According to all of this and by definition of Konijnendijk and Randrup (2005), urban forestry education could be defined as education with focus on one or more of the following topics: function, phoning, design, selection, establishment and management of urban and periorban woodland, parks, street toes and other tree resources. Nowadays, urban forestry has emerged as a new profession and a field of scientific attention. Given the wide range of skills and knowledge requited to deal with both a varied natural resource and urban society, it is not surprising that many different disciplines are involved.

The overview of urban forestry research in Europe has indicated that applied sciences with a focus on natural science-oriented fields such as forestry, horticulture, (landscape) ecology and arboriculture dominate the research arena. On the other hand, disciplines and professions with a stronger societal character, such as landscape architecture and landscape planning, also play an important role (Konijnendijk & Randrup, 2005). Many of researches and good practice in urban forestry (Forrest *et al.* 1999, Konijnendijk *et al.* 2000) have stressed the importance of developing multi and interdisciplinary approaches to studying, planning, designing, establishing and managing woodland and other tree resources in urban and perurban lands. Education takes place at many different levels, aimed at people with differing needs in terms of knowledge or skills to be acquired. Johnston (2001) lists three main fields of education within urban forestry:

1. Formal educational courses at different levels ('school' or university education).
2. Training, as usually refers to the acquisition of basic practical skills.
3. Continuing professional development, to frequently informal education to keep professionals abreast of new developments and knowledge in their field.

The term 'urban forestry' was first used in 1965 as title for a graduate study on the success and failures of municipal tree planting in part of Metropolitan Toronto (Johnston, 1996). Before that, graduates of forestry schools in North America were more frequently hired to manage municipal tree management programs because of their biological, quantitative and managerial skills (Miller, 2001). In USA there are 63 universities where is possible to study Urban Forestry. The most important universities in USA and Canada are presented in Table 1.

Europe can pride itself on a long tradition of urban green space planning, design and management. Most European countries have a tradition of close collaboration between practitioners and researchers in urban forestry. Research has been strongly rooted in practice and municipalities have been amongst the important funders of research. Many universities have specific programs in arboriculture and urban forestry (Table 2). According to Konijnendijk (2003) survey of 20 European countries identified more than 400 recent or ongoing research projects on trees and forests in the urban environment.

In Europe the urban forest resource is relatively small compared to overall forest resources, but expanding and already covering a significant area of land. Higher education (i.e. at Bachelor level or higher) on urban forestry has been less developed so far. One hundred and eighty educational institutions in 28 countries offered 31 full degree programs and 191 courses and modules (Konijnendijk, 2003). New programs and approaches such as landscape ecology and management, sustainable land use, urban ecology, and urban agriculture all take a more integrative perspective on different land uses, land covers and ecosystems.

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Table 1

The most important universities in USA and Canada with Urban Forestry education

University	Areas of study
University of Washington, USA	Forestry and Wildlands Management Graduate: Doctorate, First Professional Degree, Master Undergraduate: Bachelor
Ashford University, USA	Master MBA - Environmental Management Bachelor Degrees Bachelor - Environmental Studies
Johns Hopkins University, USA	Master MS in Environmental Sciences & Policy
Penn Foster Career School, USA	Certificates Wildlife & Forestry Conservation Career Diploma
Southern New Hampshire University, USA	Bachelor Degrees BS Environmental Science in Geospatial Technologies BS Environmental Science BS in Geosciences concentration in Natural Resources & Conservation BS Env Science in Nat Resources & Conservation
University of British Columbia, Faculty of Forestry, Canada	Bachelor of Urban Forestry in Urban Forestry Minor in Urban Green-Space Management Minor in Landscape and Recreation Planning
University of Maryland, College of Agriculture and Natural Resources (AGNR), USA	Undergraduate Programs in Urban Forestry
University of California, USA	Doctoral program of Urban Forestry
University of Toronto's, Faculty of Forestry, Canada	All level programs
Oregon State University, USA	All level programs

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Table 2

The most important universities in Europe with Urban Forestry education	
University	Areas of study
Mediterranea University of Reggio Calabria, Italy	Master in Environmental and Forest Sciences
Polytechnic Institute Of Bragança, Portugal	Master in Management of Forest Resources
University of Aberdeen, UK	Master in Forestry (Urban Forestry)
University of Wales, Bangor, UK	Agroforestry (PhD/MPhil)
Myerscough College, UK	Arboriculture and Urban Forestry (MSc)
University of Aberdeen, UK	Environmental and Forest Management (MSc)
Erasmus Mundus Master of Science in European Forestry, organised by Finland, Sweden, the Netherlands, Germany, Austria, Sweden and France.	European Forestry (MSc)
University of Eastern Finland - School of Forest Sciences	Environmental Science and Forestry
Technische Universität Dresden, Germany	Tropical Forestry master program
The University of the Highlands and Islands, UK	BSc (Hons) Forest Management

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