

Green Infrastructures and Urban forests for  
improving the environment and the quality of life  
17th November 2014 Rome



## Urban forests and quality of life: some experiences from Italy

**Giovanni Sanesi**, University of Bari

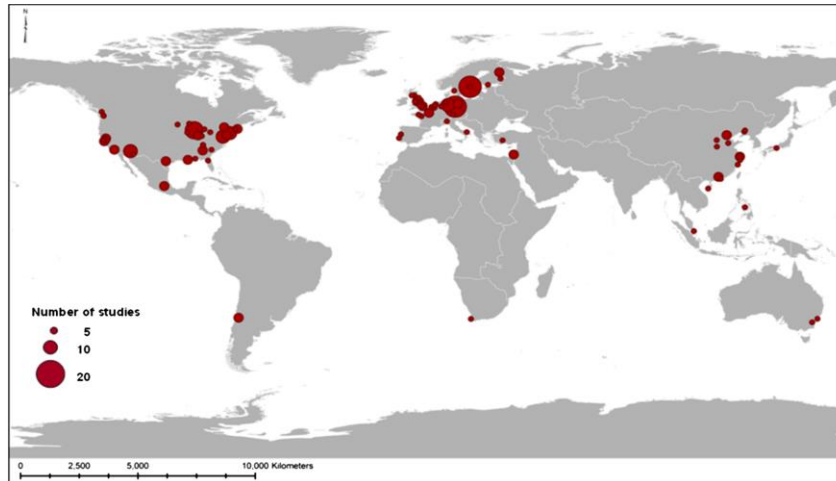
# Background

Urban (and periurban) forest provide a range of benefits to sustain and improve human livelihood and the quality of life through Urban Ecosystem Services (UES).

UES have been classified in a variety of ways; most commonly (Millennium Ecosystem Assessment, 2005), they are divided into four categories: provisioning services (material outputs, including food, water, fuel wood, etc.), regulating services (maintaining functions, such as air and soil quality and flood, storm water, etc.), habitat or supporting services (living spaces for organisms, maintaining plant and animal diversity), and cultural services (non material benefits, such as recreation, esthetic, psychological benefits, etc.).

# Background

Although urban forests (also in terms of green infrastructures) have been found promising for coping with some big challenges (e.g. climate change), large knowledge gaps, particularly for some countries (i.e. Southern and Eastern Europe, are still present.



Geographic distribution of 217 UES studies 1973-2012 (Haase et al., 2014)

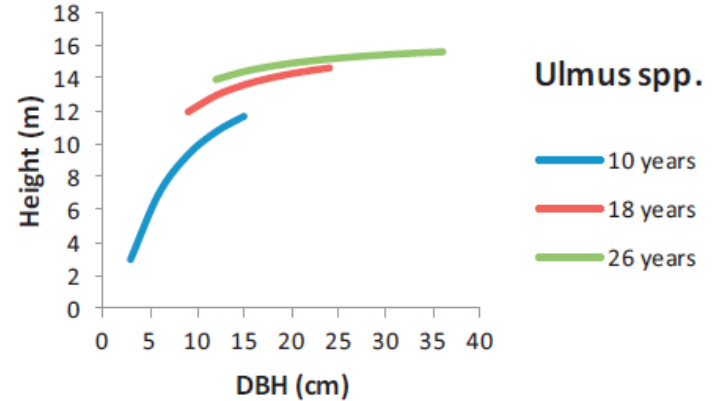
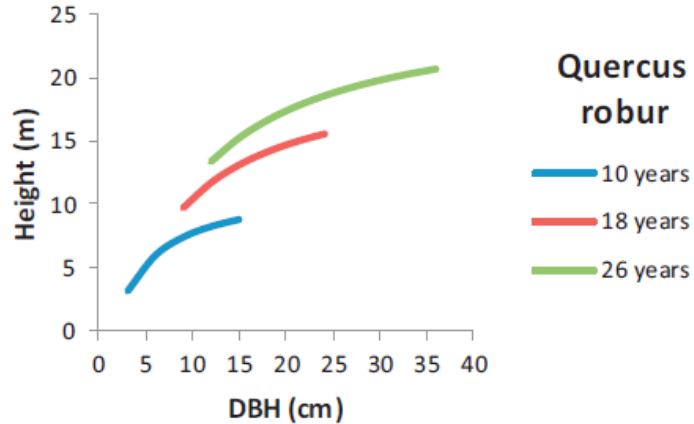
# Background



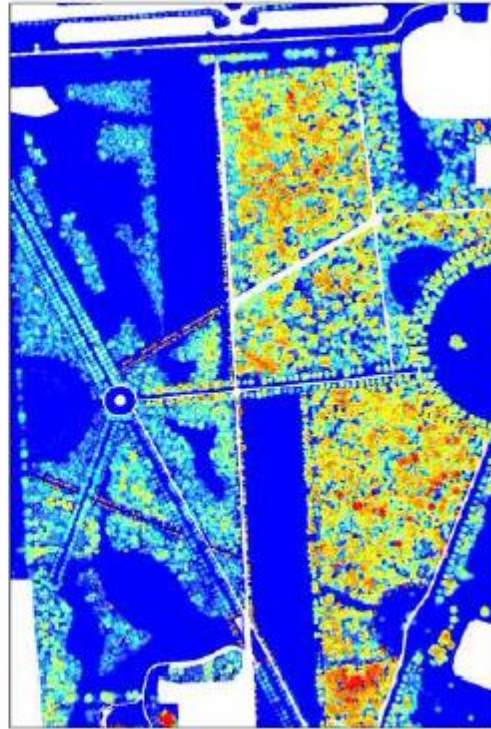
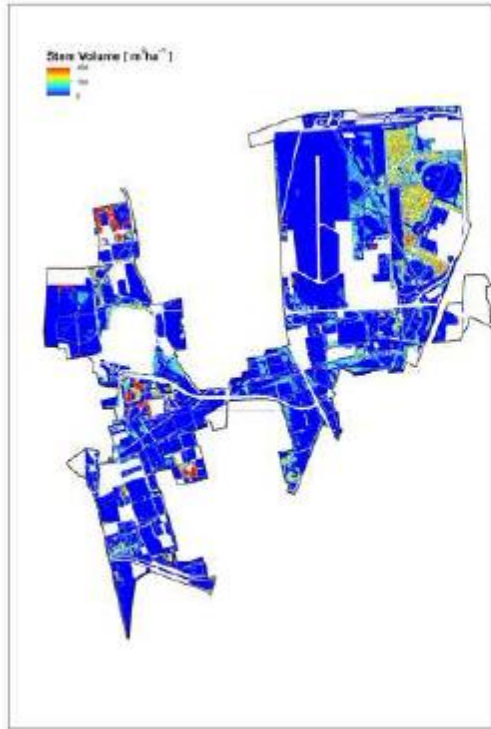
To address these gaps of knowledge and synergize their resources, along the last decade some of structures of Italian research involved in the Urban forestry decided to cooperate in different ways through various funding opportunities existing at national and international level (Prin, Firb, Cost, Fp7, Life, etc.)

This Italian universities and research centers are: CNR Institute of Agro-environmental and Forest Biology, University of Bari, University of Florence, University of Milano, University of Milano-Bicocca, University of Padua, University of Rome 3, University of Tuscia.

# Forest trees growth model

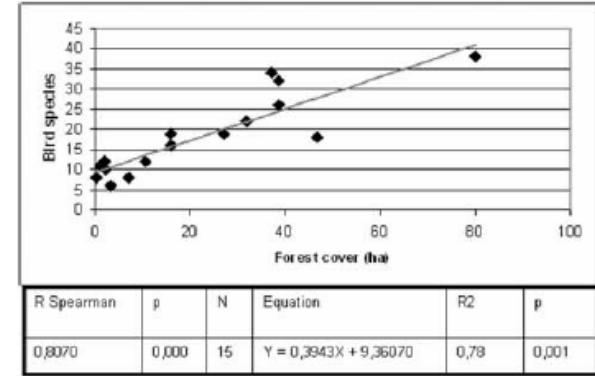
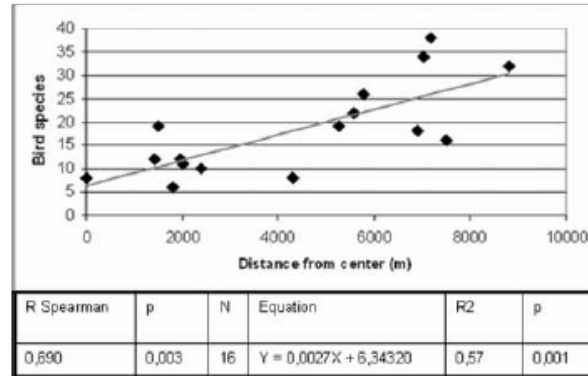
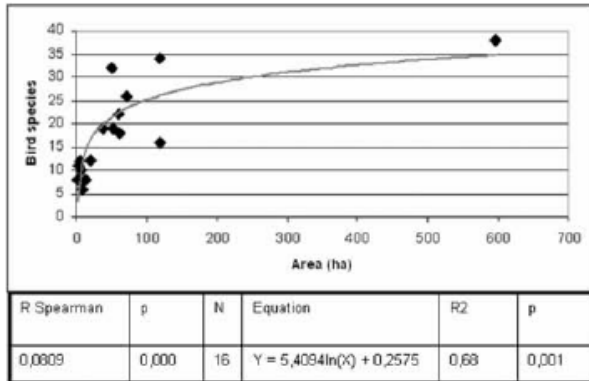


# Carbon storage



Giannico et al., under revision

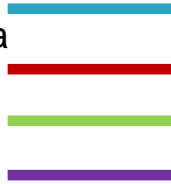
# Biodiversity



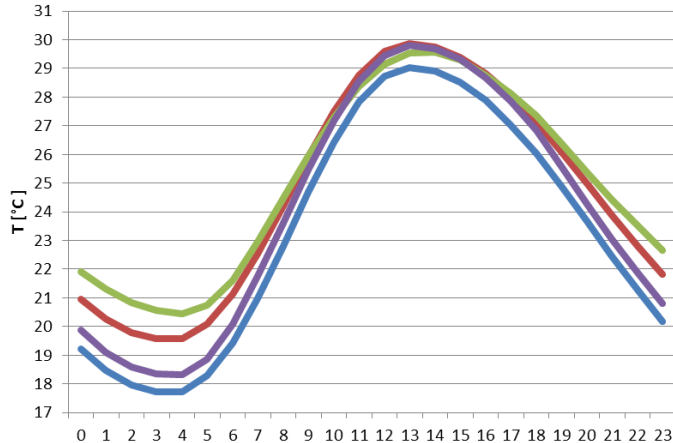
Abundance and diversity of bird species are related to different structural attributes (e.g., vegetation type) and spatial characteristics (e.g., size).

# Urban Heat Island

- Sites with increasing levels of UHI
- Milan Linate (LIML) – rural suburban area
  - Milan Marche (MIMA)– UHI plateau
  - Milan Brera (MIBR) – UHI peak
  - Milan Parco Nord (PNM) – Urban park



mean hourly temperature - July  
(average for period 1981-2013)

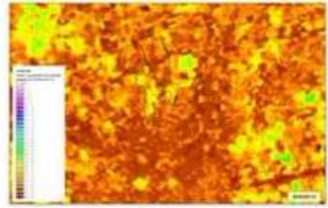


Mean hourly temperature of the month  
(1981-2013)

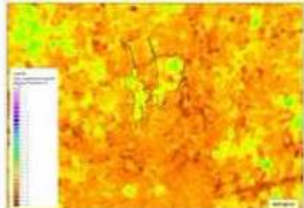
Month	Hour	LIML	PNm	MIBR	MIMA
Jan	0	0.2	1.2	2.2	2.5
	6	-1.8	-0.7	0.5	1.2
	12	4.7	5.6	5.8	5.6
	18	3.8	4.6	5.1	4.9
Apr	0	8.9	9.7	10.9	11.2
	6	7.8	8.7	10.0	10.2
	12	16.9	17.5	17.8	17.1
	18	14.8	15.5	16.0	15.7
Jul	0	19.2	19.9	20.9	21.9
	6	19.4	20.1	21.1	21.6
	12	28.7	29.5	29.6	29.1
	18	26.0	26.8	27.1	27.3
Oct	0	11.0	11.7	12.1	13.0
	6	9.0	9.9	10.4	11.6
	12	17.0	17.5	17.2	17.2
	18	15.6	15.9	15.9	16.0



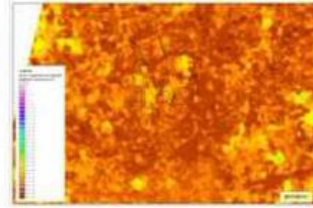
# Urban Heat Island



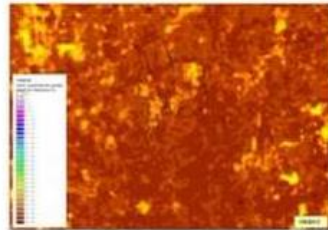
30/6/2013 11:00 am (local time)



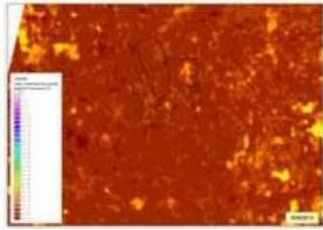
16/7/2013 11:00 am (local time)



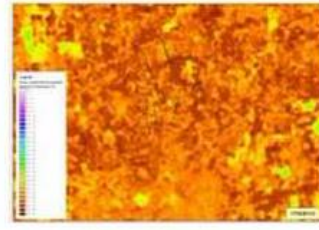
25/7/2013 11:00 am (local time)



1/8/2013 11:00 am (local time)



10/8/2013 11:00 am (local time)



17/8/2013 11:00 am (local time)

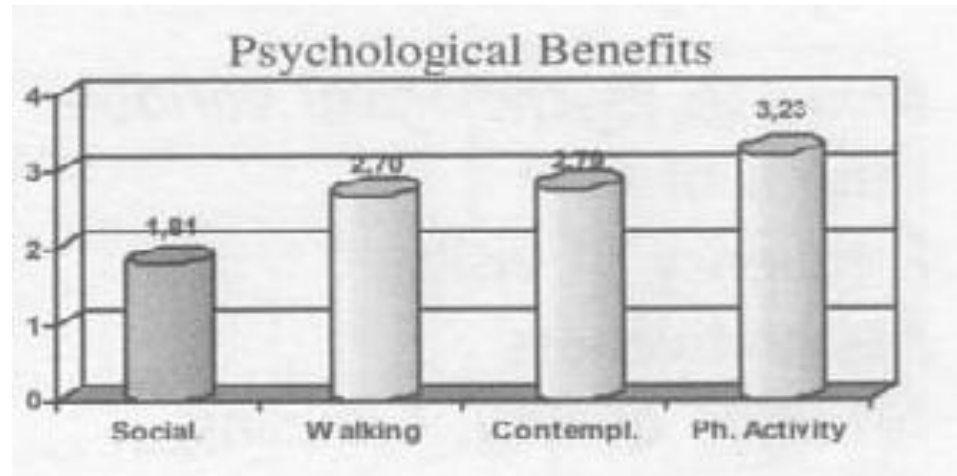
A comparison of the urban park, urban sites indicated the relevance of the urban park's mitigation with an average decrease in surface temperature of  $-2.5^{\circ}\text{C}$  for irrigated grass in full sunlight and of  $-3.8^{\circ}\text{C}$  for surface shaded by tree canopy.

# Wellbeing

	Psy ben	Phys ben	Well during	Well after	Benefits	Well-being	Ben & well
Visit frequency	0.26	0.19	0.17	0.11	0.27	0.15	0.25
Visit duration	0.09	0.11	0.18	0.19	0.12	0.21	0.19
Amount of physical activity performed during the visit	ns	0.23	0.12	0.15	0.17	0.16	0.20
Preference for shade	0.13	ns	ns	-0.08*	0.08*	ns	ns
Effort required to reach the green space	0.16	0.16	0.17	0.09*	0.18	0.14	0.19
Importance of water accessibility	ns	0.09*	ns	0.07	ns	0.07*	0.08*

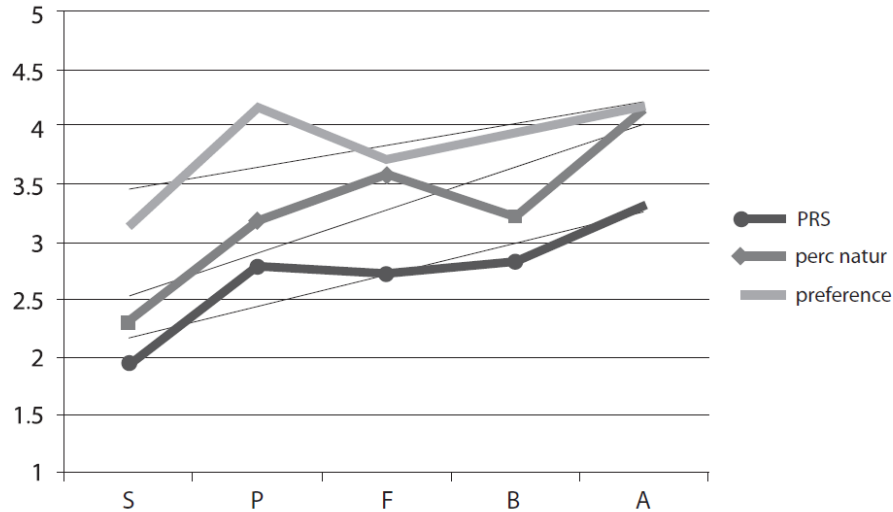
Lafortezza et al., 2009

# Wellbeing



Scopelliti et al., 2012

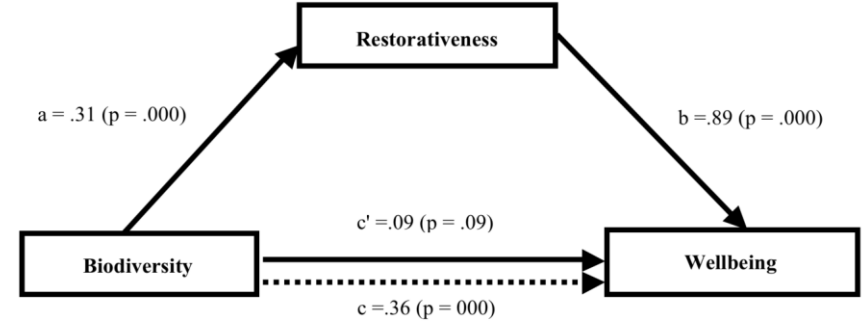
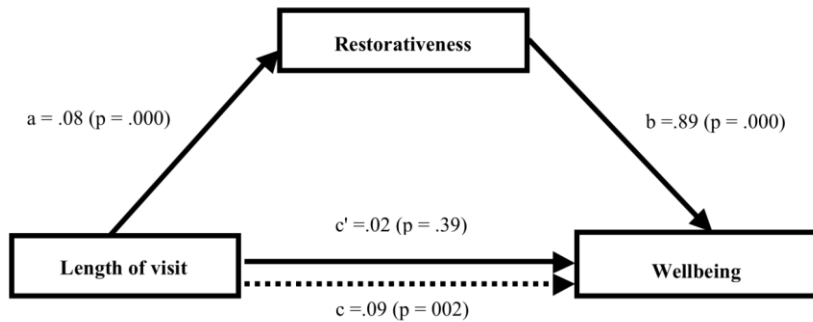
# Wellbeing



Different types of green spaces have different restorative potential; normally 'natural settings' have greater restorative potential than built ones; people perceive nature as being highly restorative, and prefer 'nature' over other settings.

Carrus et al., 2013

# Wellbeing



Carrus et al., in press

# Conclusion

- The crucial role of Urban forests (UF) have a crucial in providing Ecosystem services (ES);
- Some gaps in ES knowledge especially in some countries;
- UF can ameliorate the quality of life by improving the quality of urban ecosystem; periodic monitoring to evaluate the consistence and meaning of UF also in terms of ES;
- UF can help us in coping the global change challenge;
- Technical and scientific approach coupled with citizen involvement (behaviors, preferences, participation, new governance model).

# UPCOMING EVENT

<http://iufrole2015.to.ee/>

IUFRO Landscape Ecology Conference

## SUSTAINING ECOSYSTEM SERVICES IN FOREST LANDSCAPES

concepts, research, and applications

23-30 August 2015 Tartu, Estonia

The biannual meeting of the IUFRO Landscape Ecology Working Party will be held in Tartu, Estonia August 23-30, 2015. The co-sponsors of this meeting include Estonian University of Life Sciences, University of Tartu, Tartu Observatory, and European Land-use Institute.

### Conference Topics

Within the main conference theme "Sustaining ecosystem services in forest landscapes", we consider many subthemes, including:

- Adapting to climate change
- Conserving biodiversity
- Managing gene flows and species migrations
- Enhancing ecological resilience
- Managing natural and anthropogenic disturbances
- Abating pollution
- Managing water quality
- Supplying commodities
- Preserving cultural values
- Providing aesthetics and recreation

Our goal is to examine these topics within the context of landscape mosaics with forests of all types – natural, plantation, and urban – and examine concepts (e.g., ecological theory, philosophy, legal and social frameworks), research (e.g., new approaches to analyzing spatial patterns, monitoring processes, simulation modelling, multiple scales), and applications (governance, policies, strategies, and practices at local, regional, national, continental, and global scales).

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