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Volume 22, Issue 1 (January)

[< Previous](#) [Next >](#)



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Volume 22, Issue 1 (January 2012)

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Manes, Fausto, Guido Incerti, Elisabetta Salvatori, Marcello Vitale, Carlo Ricotta, and Robert Costanza. 2012. Urban ecosystem services: tree diversity and stability of tropospheric ozone removal. *Ecological Applications* 22:349–360. <http://dx.doi.org/10.1890/11-0561.1>

Articles

Urban ecosystem services: tree diversity and stability of tropospheric ozone removal

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Urban forests provide important ecosystem services, such as urban air quality improvement by removing pollutants. While robust evidence exists that plant physiology, abundance, and distribution within cities are basic parameters affecting the magnitude and efficiency of air pollution removal, little is known about effects of plant diversity on the stability of this ecosystem service. Here, by means of a spatial analysis integrating system dynamic modeling and geostatistics, we assessed the effects of tree diversity on the removal of tropospheric ozone (O₃) in Rome, Italy, in two years (2003 and 2004) that were very different for climatic conditions and ozone levels. Different tree functional groups showed complementary uptake patterns, related to tree physiology and phenology, maintaining a stable community function across different climatic conditions. Our results, although depending on the city-specific conditions of the studied area, suggest a higher function stability at increasing diversity levels in urban ecosystems. In Rome, such ecosystem services, based on published unitary costs of externalities and of mortality associated with O₃, can be prudently valued to roughly US\$2 and \$3 million/year, respectively.

Key words: [air quality](#), [ecophysiology](#), [ecosystem function](#), [GIS](#), [Rome, Italy](#), [sanitary benefits](#), [tropospheric ozone](#), [urban forest](#)

Received: March 24, 2011; Accepted: August 5, 2011; Revised: August 23, 2011

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Cited by

Pasquale A. Marziliano, Raffaele Laforteza, Giuseppe Colangelo, Clive Davies, Giovanni Sanesi. (2013) Structural diversity and height growth models in urban forest plantations: A case-study in northern Italy. *Urban Forestry & Urban Greening*
Online publication date: 1-Mar-2013.

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Online publication date: 1-Dec-2012.

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