

We are unable to supply this entire article because the publisher requires payment of a copyright fee. You may be able to obtain a copy from your local library, or from various commercial document delivery services.

From Forest Nursery Notes, Summer 2013

38. © Seedling growth and soil nutrient availability in exotic and native tree species: implications for afforestation in southern China. Wang, F., Zhu, W., Zou, B., and Neher, D. A. *Plant and Soil* 364:207-218. 2013.

Seedling growth and soil nutrient availability in exotic and native tree species: implications for afforestation in southern China

Faming Wang · Weixing Zhu · Bi Zou ·
Deborah A. Neher · Shenglei Fu · Hanping Xia ·
Zhian Li

Received: 23 February 2012 / Accepted: 25 June 2012 / Published online: 13 July 2012
© Springer Science+Business Media B.V. 2012

Abstract

Background and aims The relationship between tree species and soil nutrient availability is critical for evaluating plantation succession and promoting forest restoration. This study was conducted to evaluate the impact of exotic and native tree species on soil nutrient availability.

Methods Four exotic species (*Eucalyptus urophylla*, *E. tereticornis*, *Acaia auriculaeformis*, *A. mangium*) and four native species (*Castanopsis fissa*, *Schima superba*, *C. hystrix*, *Michelia macclurei*) were planted

and grown for one-year. Soil solution (DOC, DON, $\text{NH}_4\text{-N}$, $\text{NO}_3\text{-N}$) was sampled and analyzed during the study. After the experiment, soil properties were determined, and plant tissues were analyzed.

Results DOC levels were greater in soils with trees planted than controls without trees. Compared to native species, exotic species had much faster growth rates and greatly reduced DON and $\text{NO}_3\text{-N}$ concentrations. Exotic species always had less P concentrations in leaves and stems than native species. Furthermore, N-fixing *A. auriculaeformis* led to greater soil available P compared to other species.

Conclusions Based on these findings, we provide some recommendations for afforestation practice. This study highlights that a better understanding of the pros and cons of exotic species would be beneficial to advance afforestation in China and the world.

Responsible Editor: Hans Lambers.

Electronic supplementary material The online version of this article (doi:10.1007/s11104-012-1353-x) contains supplementary material, which is available to authorized users.

F. Wang · B. Zou · S. Fu · H. Xia · Z. Li (✉)
Key Laboratory of Vegetation Restoration and Management
of Degraded Ecosystems, South China Botanical Garden,
Chinese Academy of Sciences,
Xingke Road 723, Tianhe District,
Guangzhou, People's Republic of China 510650
e-mail: lizan@scbg.ac.cn

W. Zhu
Department of Biological Sciences,
State University of New York-Binghamton,
Binghamton, NY 13902, USA

D. A. Neher
Department of Plant and Soil Science,
University of Vermont,
Burlington, VT 05405, USA

Keywords Soil solution · Nutrient availability, exotic species · Native species · Afforestation, South China

Abbreviation

DOC Dissolved organic C
DON Dissolved organic N.

Introduction

In subtropical and tropical areas, millions of hectares of forests are being deforested or degraded due to human activities (FAO 2011; Lamb et al. 2005).