

Effects of Scots Pine (*Pinus sylvestris* L.) plantations on plant diversity in Northern Mongolia

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Abstract

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This study was carried out in Scots pine (*Pinus sylvestris* L.) plantations that were previously established in West Khentii Mountains of Northern Mongolia. In this study, species composition, richness, diversity and plant cover changes among planted forests with different plantation ages were analyzed. We found an obvious difference of species composition between natural stands and plantations. Our findings revealed continuous changes in vascular plant composition among plantations by increasing light-demanding species. A number of species from forest and forest-meadow mesophytes were replaced with xerophytes from forest-steppe and steppe. Current profound changes in species composition and a stable existence of invasive plant species from different ecological groups have a tendency to be stored during the initial stage of forest plantation establishment. The strong effect of planted trees on the growing environment appeared rather late, and has intensified since 15 years after the plantation establishment.

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Introduction

Conservation of biological diversity is a key component of sustainable forest management (Jobidon & Thiffault, 2004), and biodiversity provides a broad array of ecosystem services (Wang & Chen, 2010). Biological diversity often becomes a crucial indicator of ecosystem sustainability, therefore, it is important to understand the dynamics and heterogeneity of natural forests (Spies & Barnes, 1985). Therefore, species richness in a region indicates the structural complexity of forest ecosystems and the ability to respond to environmental changes. In addition, Hix and Percy (1997) as well as Jenkins and Parker (1998) highlighted that biodiversity is composed of both quantitative and qualitative components, and the interaction of plants with environmental factors determines the distribution and species

abundance in the region.

Species composition of vascular plants can be an indicator of environmental changes, and through measuring plant community structure in detail, we can assess the changes of the ecosystem in semi-arid zones (Kawada *et al.*, 2005; Vesik & Westoby, 2001). World Bank (2004) reported that, forests in Mongolia have been severely degraded by wildfire, over-exploitation and dramatic changes in climate in recent decades. Distribution of Scots pine forests in Mongolia is very limited, covering only 5% of the estimated 160,000 km² of forested area (Tsogbaatar, 2004). Over the last few decades, most logging activities in Mongolia were concentrated in Scots pine forests and combined with disturbances, such as forest fire, improper commercial logging, overgrazing and damage