

数据资源: [林业专题资讯](#)

打印

下载

分享

A Combination of Biotic and Abiotic Factors and Diversity Determine Productivity in Natural Deciduous Forests

编号 010031601

推送时间 20211108

研究领域 [森林生态](#)

年份 2021

类型 期刊

语种 英语

标题 A Combination of Biotic and Abiotic Factors and Diversity Determine Productivity in Natural Deciduous Forests

来源期刊 forest

期 第316期

发表时间 20211025

关键词 [biotic and abiotic factors](#); [forest productivity](#); [parametric and nonparametric models](#); [tree volume growth](#);

摘要

The relative importance of different biotic and abiotic variables for estimating forest productivity remains unclear for many forest ecosystems around the world, and it is hypothesized that forest productivity could also be estimated by local biodiversity factors. Using a large dataset from 258 forest monitoring permanent sample plots distributed across uneven-aged and mixed forests in northern Iran, we tested the relationship between tree species diversity and forest productivity and examined whether several factors (solar radiation, topographic wetness index, wind velocity, seasonal air temperature, basal area, tree density, basal area in largest trees) had an effect on productivity. In our study, productivity was defined as the mean annual increment of the stem volume of a forest stand in $m^3 ha^{-1} year^{-1}$. Plot estimates of tree volume growth were based on averaged plot measurements of volume increment over a 9-year growing period. We investigated relationships between productivity and tree species diversity using parametric models and two artificial neural network models, namely the multilayer perceptron (MLP) and radial basis function networks. The artificial neural network (ANN) of the MLP type had good ability in prediction and estimation of productivity in our forests. With respect to species richness, Model 4, which had 10 inputs, 6 hidden layers and 1 output, had the highest R^2 (0.94) and the lowest RMSE (0.75) and was selected as the best species richness predictor model. With respect to forest productivity, MLP Model 2 with 10 inputs, 12 hidden layers and 1 output had R^2 and RMSE of 0.34 and 0.42, respectively, representing the best model. Both of these used a logistic function. According to a sensitivity analysis, diversity had significant and positive effects on productivity in species-rich broadleaved forests (approximately 31%), and the effects of biotic and abiotic factors were also important (29% and 40%, respectively). The

productivity–diversity relationships. View Full-Text

服务人员 王璐
服务院士 蒋有绪
PDF文件 浏览全文

相关记录

更多

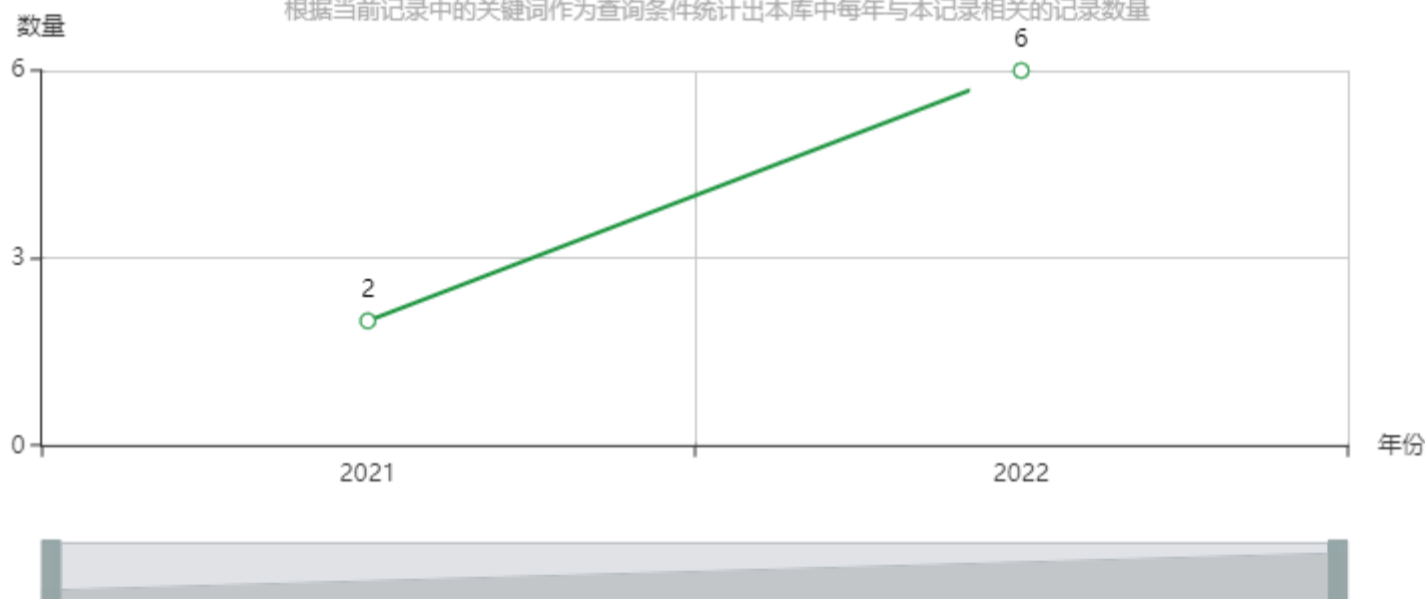
Modeling Tree Growth Responses to Climate Change: A Case Study in Natural Dec...	2022-12-26
Species Richness Promotes Productivity through Tree Crown Spatial Complement...	2022-11-14
Effects of Fertilizers and Litter Treatment on Soil Nutrients in Korean Pine Plantati...	2022-10-31
Growth, Productivity, Biomass and Carbon Stock in Eucalyptus saligna and Greville...	2022-10-17
Changes within a South Carolina Coastal Wetland Forest in the Face of Rising Sea ...	2022-03-21
Impact of Ice-Storms and Subsequent Salvage Logging on the Productivity of Cun...	2022-02-28

相关图谱

相关主题趋势分析图



根据当前记录中的关键词作为查询条件统计出本库中每年与本记录相关的记录数量



相关链接: 中国工程院 国家林业和草原局 中国林业科学研究院 中国林业信息网 中国林业数字图书馆 国家林业和草原科学数据中心

友情链接: 自然资源部 科学技术部 中国林学会 中国科技资源共享网 中国林草植物新品种保护 中国林业知识产权网 中国林业新闻网

主办单位: 中国林业科学研究院林业科技信息研究所 电话: 010-62889748 E-mail: wangjiaosky92@163.com 京ICP备14021735号-2 访问量: 12458766
建议使用谷歌、火狐、360、IE8或IE8以上版本的浏览器