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会同林区林下植被与乔木层树种的关系

(1.中国科学院会同森林生态实验站,辽宁 沈阳 110016;2.吉首大学生物资源与环境科学学院,湖南 吉首 416000;3.湖南保靖县林业局,湖南 保靖 416500;4.Department of Botany,Panjab University,Chandigarh 160014,India)

Relationship Between Understory Vegetation and Canopy Stratum Trees in Huitong Forest Region

(1.Huitong Experimental Station of Forest Ecology,Chinese Academy of Sciences,Shenyang 110016,China;2.Jishou University,Jishou 416000,Hunan China;3.Forestry Bureau of Baojing,Baojing 416500,China;4.Department of Botany,Panjab University,Chandigarh 160014,India)

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摘要 利用NMS排序和主成分分析方法,分离乔木层变量成林分结构和林冠物种组成2个主成分,并以其作为林下植被的环境因子,检查了上层乔木对林下植被多样性、物种组成和集群格局的影响.结果显示林冠的物种组成与林下植被的Shannon多样性显著相关,而林分结构跟多样性没有直接的联系;林分结构和林冠组成均显著地影响了林下植被的物种分布,像杜英、千年桐、胡颓子、青冈、野柿、黄樟的分布跟林分结构紧密相关,半朔苣苔、华东安蕨、三叶木通、紫楠、香港四照花跟林冠组成紧密相关,然而林冠组成相对于林分结构解释了更多的物种分布;集群格局的零模拟分析还显示林冠组成显著地影响了林下植被的群落格局.本研究结果支持林冠组成是生态系统过程的主要驱动,也表明林冠组成是林下层群落格局形成的原因.

关键词: 林冠组成 林分结构 排序 常绿阔叶林

Abstract: Non-metric multidimensional scaling (NMS) analysis was used to get two direct gradients in canopy tree species-site relationships from canopy data set,then principal components analysis was used to extract two principal components (PC1 and PC2) from canopy variables including the two direct gradients and other canopy parameters as the environment variables of understory vegetation,and how the two principal components affect understory vegetation was studied,not only in species diversity and composition but also with reference to species assemblages.No significant effect of forest structure (represented by PC1 scores) on diversity of understory vegetation was found,however canopy composition (represented by PC2 scores) has a strong influence,explaining 36.9% variation in understory species diversity.DCCA (detrended canonical correspondence analysis) ordination to was used to explore the changes in understory species composition-canopy relationships,and canopy variables was found to significantly influence the distribution of the understory species.For example,Elaeocarpus decipiens,Aleurites Montana,Elaeagnus pungens,Cyclobalanopsis glauca,Diospyros kaki. var. sylvestuis and Cinnamomum parthenoxylon are strongly associated with forest structure,and Hemiboea henryi,Anisocampium sheareri,Akebia trifollata,Dendrobenthamia honghongensis and Phoebe sheareri are strongly associated with canopy composition.However forest structure is much weaker than canopy species composition in explaining understory composition.Null-model was also used to test the understory species co-occurrence patterns along three different forest structure and canopy composition scales.Only canopy composition significantly influences Stone and Roberts's C-score.The results suggest that canopy composition is among the most influential forces in ecosystem process,and imply that canopy composition might have played a major role in creating observed understory community patterns.

Key words: canopy composition forest structure ordination evergreen broad-leaved forest

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作者简介：龙凤菊（1974-），女，湖南保靖人，保靖县林业局工程师，主要从事植物分类学研究

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通讯地址：湖南省吉首市人民南路120号《吉首大学学报》编辑部　邮编：416000
电话传真：0743-8563684　E-mail：xb8563684@163.com　办公QQ：1944107525