

研究论文

# 天童米槠-木荷群落主要树种的结构及空间格局

杨永川<sup>1, 2, 3</sup>, 达良俊<sup>3, 4</sup>, 陈波<sup>5</sup>

1.重庆大学三峡库区生态环境教育部重点实验室, 重庆400045

2.重庆大学城市建设与环境工程学院,

3.华东师范大学环境科学系, 上海200062

4.上海市城市化生态过程与生态恢复重点实验室, 上海200062

5.杭州师范学院生命科学学院, 杭州310036

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**摘要** 种群的结构和空间格局是植物群落的重要特征。以浙江天童米槠(*Castanopsis carlesii*)-木荷(*Schima superba*)群落为对象, 应用永久样方法和每木调查法调查了群落种类组成和结构, 并对10个主要常绿阔叶树种的种群结构和空间格局进行了分析, 种群结构分析包括胸径级结构和垂直层次结构, 空间格局分析包括各种不同垂直层次个体的空间分布格局和空间关联, 并考虑了空间关联的尺度依赖。所选10个种总体RBA值达到81.9%, 包含了群落的全部5个优势种, SDI指数除黑山山矾(*Symplocos heishanensis*)为正值外, 其余9种皆为负值, 各个种在垂直空间上占据了不同的位置。不同种之间以及同种不同层次之间表现出复杂多样的分布格局, 体现出多级复合分布特征, 但多数种整体上表现为集群分布或基本分布成分为个体群。空间关联在不同种之间、同种不同层次之间以及不同空间尺度上发生了分化, 随尺度的增加, 正关联增加而负关联减少。各个物种通过占据不同的水平和垂直空间, 并采取不同的生活史对策, 在群落中得以共存, 从而导致了群落高的生物多样性的形成和维持。

**关键词** [常绿阔叶林](#); [种群结构](#); [空间分布格局](#); [空间关联](#); [尺度依赖](#)

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## Population structure and spatial patterns for the main tree species in *Castanopsis carlesii*-*Schima superba* community in Tiantong, Zhejiang Province, China

YANG Yong-Chuan<sup>1, 2, 3</sup>, DA Liang-Jun<sup>3, 4</sup>, CHEN Bo<sup>5</sup>

1. Key Lab. of Three Gorges Reservoir Region's Eco-Environment (Chongqing University), Ministry of Education, Chongqing 400045, China;

2. Faculty of Urban Construction and Environmental Engineering, Chongqing University, Chongqing 400045, China;

3. Department of Environmental Science, East China Normal University, Shanghai 200062, China;

4. Shanghai Key Laboratory for Ecology of Urbanization Process and Eco-restoration, Shanghai 200062, China;

5. School of Life Science, Hangzhou Normal College, Hangzhou 310036, China

**Abstract** Population structure and spatial patterns are important characteristics of plant communities and they can reveal ecological characteristics of the species. This study was carried out in the evergreen broad-leaved forest of Tiantong (29°48'N, 121°47'E) with *Castanopsis carlesii* and *Schima superba* as the most important dominant species. The floristic composition and community structure were investigated using quadrat method and every-tree measuring method, and the population structure, spatial distribution and spatial association of individuals in different layers for 10 main tree species were analyzed.

The total relative basic area(RBA) of the 10 species, including the 5 dominant species of the community, was over 81.9%. The size distribution index(SDI) was negative and relative low except for *Symplocos heishanensis* which had a positive value. The species occupied different vertical spa

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ce, however, *C.fargesii* which distributed in its northern boundary lacked the sub-tree layer to some extent, while *Lithocarpus harlandii*, *Cyclobalanopsis gracilis* and *C. nubium* whose most suitable sites located in the mid-mountains showed obvious stunting characters in the studied area.

The spatial distribution varied among intra- and inter-specific cohorts in the different layers and showed complex multilevel distribution patterns, but most species had an aggregated distribution or had colony as the basic units considering the total number of individuals. There were differences in spatial associations among intra- and inter-specific cohorts in the different layers and spatial scales examined. Distribution patterns of *Castanopsis carlesii* and *Schima superba* indicated that they were more adaptive in the whole section, while *C. fargesii* was distributed in limited habitats. The spatial associations indicated that *C. carlesii* and *S. superba* were strong-positively associated, but they were strong-negatively associated with *C. fargesii* at the scale less than 100m<sup>2</sup>. The positive associations among cohorts increased and the negative associations decreased as the scale increased. When the scales analyzed were 25m<sup>2</sup>, 100m<sup>2</sup> and 400m<sup>2</sup>, the number of pairs with strongly positive associations were 5, 26 and 60, respectively, while the number of pairs with strongly negative associations were 110, 73 and 47. The result implied that the critical factors forming the observed spatial associations varied with the spatial scales. By occupying different horizontal and vertical space and having different life history strategies, the main species of the community could exist, resulting in rich biodiversity in the studied community.

**Key words** evergreen broad-leaved forest population structure spatial distribution patterns spatial associations scales dependence

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通讯作者 杨永川 [yongchuanyang@yahoo.com.cn](mailto:yongchuanyang@yahoo.com.cn)