

Research hotspots of forest spatial structure based on CiteSpace mediated bibliometric method

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Abstract: 【Objective】 The forest spatial structure directly affects the forest productivity and diversity, and its adjustment and optimization is key and foundation of the precise improvement of forest quality. Over the past few decades, China has done a lot of work in the research field of forest spatial structure and published many valuable academic papers. This study attempted to intuitively and systematically explore the dynamics and trends of forest spatial structure research in China. 【Method】 We searched the CNKI (China National Knowledge Infrastructure) database for publications pertaining to forest spatial structure research in China from 1999 to 2022 by using bibliometric methods. We then used CiteSpace to visually analyze the authors and cooperative relations, research institutions and their partnerships, keywords, hotspots, and so on. 【Result】 A total of 653 research papers on forest spatial structure in China were published in CNKI database from 1999 to 2022, showing an increasing trend among different years. 2013-2015 and 2019-2022 were the two critical eruption periods, and the number of published papers reached the peak in 2014 (61 papers). During the initial exploration stage from 1999 to 2006, the rapid development stage from 2007 to 2014, and the steady growth stage from 2015 to 2022, Hui Gangying, Hu Yanbo, Zhao Zhonghua, Liu Wenzhen and so on, as well as Li Jiping, Zhang Huiru, Tang Mengping and so on, were close collaborators in the field of forest spatial structure, respectively. With the largest node concentric circles and the highest intermediate centrality, Professor Hui Gangying was the pioneer and core author, and the Chinese Academy of Forestry and Beijing Forestry University were the core research institutions in this field, accounting for 21.90% and 16.85% of the total published papers in CNKI, respectively. The keywords were cluster analyzed and divided into 13 groups and 2 types, focusing on the hot research areas of non-spatial structure and spatial structure, respectively. The research on forest spatial structure had the multiplicationthe characteristics, and its keywords have gradually evolved from "diameter structure" and "distribution pattern" to "competition index" and "quadrivariate distribution", etc., while "spatial structure", "uniform angle index", "mingling" and "plantation" were eternal research themes and hotspots. 【Conclusion】 In the past 20 years, the number of papers published in the research field of forest spatial structure in China has increased rapidly, showing a diversified development trend. Hui Gangying and his affiliated Chinese Academy of Forestry were the core research force, and "spatial structure" "uniform angle index" "mingling" and "plantation" were the eternal themes and research hotspots, indicating that in the field of forest spatial structure the basic theories are more perfect, the technical systems were more mature, and the application and promotion were more intimately. From the perspective of collecting literatures, this study describes quantitatively, objectively and scientifically the research status and hotspots in the field of forest spatial structure in the past 20 years, which will promote the intensively study of forest spatial structure in China, and provide reference information for scholars in related fields to summarize research trends and scientific problems.

基于 CiteSpace 文献计 法的森林空 结构研究热点分析

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摘要:【背景】森林空间结构直接影响森林生产力和稳定性,其调整和优化是森林质量精准提升的基础和关键。【目的】中国在森林空间结构研究领域做了大量原创性工作,发表了众多有价值的学术论文,本文拟直观系统地探讨中国森林空间结构研究状态和趋势。【结果】通过文献计量方法对 1999-2022 年中国森林空间结构研究领域中国知网(CNKI)数据库收录的论文数量、文献作者及其合作关系等进行统计,并借助 CiteSpace 文献可视化软件,分析论文的文献作者及其合作关系、文献研究机构及其合作关系、关键词和研究热点等。1999-2022 年 CNKI 数据库共收录中国森林空间结构研究文献 653 篇,不同年际间发文量呈波动递增趋势,其中 2013-2015 年和 2019-2022 年是两个关键爆发期,特别是在 2014 年发文量达到峰值(61 篇);在 1999-2006 年起始探索阶段、2007-2014 年快速发展阶段和 2015-2022 年平稳增长阶段森林空间结构领域分别出现惠刚盈、胡艳波、赵中华、刘文桢等和李际平、张会儒、汤孟平等密切合作者,其中,惠刚盈研究员的节点同心圆最大且中介中心性最高,是该领域的开拓者和核心作者,中国林业科学研究院和北京林业大学是该领域的核心研究机构,CNKI 收录论文数量占比分别为 21.90%和 16.85%,关键词聚类分析为 13 个类群 2 种类型,分别侧重于非空间和空间结构热点研究领域;森林空间结构领域呈现多元化特征,其关键词从“直径结构”“分布格局”逐步演变为“竞争指数”“四元分布”等,而“空间结构”“角尺度”“混交度”“人工林”是永恒的研究主题和热点。【结论】近 20 年中国森林空间结构研究领域发文量增长迅猛,呈现多元化发展态势,惠刚盈及其所属中国林业科学研究院是核心研究力量,“空间结构”“角尺度”“混交度”“人工林”等是研究的永恒主题和热点,说明森林空间结构领域基础理论更加完善,技术体系更加成熟,应用推广更加深入。本研究从收录论文的角度,定量、客观、科学地描述了近 20 年森林空间结构领域的研究状况和热点,这将促进中国森林空间结构的深入研究,并为相关领域学者凝练研究动向和科学问题等提供参考信息。