

基于文献计量的土壤遗留效应研究态势与热点分析

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摘 要: 土壤遗留效应是介导植物群落和土壤特性之间相互作用的重要机制, 不仅影响植物群落动态和物种共存, 同时在土地利用和管理方面也发挥着重要作用。为进一步加深对土壤遗留效应相关研究的认知, 探索该研究领域在未来的研究重点, 本文采用文献计量的方法, 以“soil legacy (土壤遗产)”或“soil legacy effect (土壤遗留效应)”为关键词, 在 Web of Science 数据库中检索了 2000—2022 年发表的相关文章, 剔除与主题相关性不强的会议摘要、社论材料、书籍章节等, 最终得到 1518 篇文献, 其中包括期刊论文 1449 篇, 综述论文 69 篇。分析了发文量、文献期刊及被引频次、学科分布、发文国家、机构、作者和关键词热点等主要内容, 利用 VOSviewer 软件构建关键词共现图谱, 借助 Scimago Graphica 软件将不同发文国家的合作关系进行可视化。结果表明, 土壤遗留效应研究领域的发文量总体呈现上升趋势, 趋势大致可分为起步阶段、稳步增长阶段和快速发展阶段。该研究内容涉及众多学科领域, 其中生态学、环境科学、土壤学和植物科学是该领域的主要发文学科。目前美国在土壤遗留效应研究领域处于领先地位, 其中美国农业部是发文量最多的机构 (646 篇)。中国虽然在该研究领域起步较晚, 但发展迅速, 且作为发展中国家在该研究领域有着较为突出的贡献, 同时以中国科学院为代表的国内科研机构发文量仅次于美国。《Soil Biology Biochemistry》是该研究领域的主要发文期刊, 高被引论文多集中在国外学者发表的顶级期刊, 而中国仍缺乏有影响力的国际期刊, 因此还需加强该领域高水平、高认可度研究成果的产出。目前, 该研究领域显示出全球交流和联系日益密切的趋势, 但考虑到地理位置的因素, 未来各研究团队仍需加强彼此合作。此外, 该领域研究热点主要集中在以下几方面: 土壤遗留效应对土壤微生物群落、对农业土地管理及利用、对不同生态系统恢复的影响以及驱动遗留效应的气候因素等, 这些方面仍将是未来的研究重点。此外, 以后的研究还可结合新兴技术手段, 如遥感、GIS 和模型模拟等技术, 推动土壤遗留效应的定量评估和预测, 为实现可持续土地管理和生态系统发展提供支撑。

关键词: 土壤遗留效应; Web of Science 数据库; 文献计量; 可视化分析; 研究态势

Analysis of Soil Legacy Effect Research Trends and Hot Spots Based on Bibliometrics

Abstract: Soil legacy effect is an important mechanism mediating the interaction between plant community and soil characteristics, which not only affects plant community dynamics and species coexistence, but also plays an important role in land use and management. In order to further deepen the understanding of the research on soil legacy effect and explore the research focus of this research field in the future, this paper adopts the bibliometric method, with "soil legacy" or "soil legacy effect" as the key words. By searching relevant articles published from 2000 to 2022 in the Web of Science database, and excluding conference abstracts, editorial materials, book chapters, etc., which are not strongly relevant to the topic, 1518 literatures are finally obtained, including 1449 journal papers and 69 review papers. The paper analyzed the number of publications, literature journals and citation frequency, subject distribution, publishing country, institution, author and keyword hotspots, etc. VOSviewer software was used to construct keyword co-occurrence graph, and Scimago Graphica software was used to visualize the cooperative relationship between different publishing countries. The results showed that the number of papers published in the field of soil legacy effect showed an overall upward trend, which could be roughly divided into initial stage, steady growth stage and rapid development stage. The content of this research involves many disciplines, among which ecology, environmental science, soil science and plant science are the main published disciplines in this field. At present, the United States leads the field of soil legacy effect research, with the United

States Department of Agriculture being the most published institution (646). Although China started late in this research field, it has developed rapidly, and as a developing country, it has made outstanding contributions in this research field. Meanwhile, the number of papers published by domestic scientific research institutions represented by the Chinese Academy of Sciences is second only to that of the United States. Soil Biology Biochemistry is the main publication journal of the field of research. Highly cited papers are mostly concentrated in top journals published by foreign scholars, while China still lacks influential international journals, so it is still necessary to strengthen the output of high-level and highly recognized research results in this field. At present, the field of research shows an increasing trend of global exchanges and connections, but considering the factors of geographical location, the research teams will need to strengthen their cooperation in the future. In addition, the research focus in this field mainly focuses on the following aspects: the impact of soil legacy effect on soil microbial communities, agricultural land management and use, the impact on the restoration of different ecosystems, and the climate factors driving legacy effect, which will remain the focus of future research. In addition, future studies can be combined with emerging technologies, such as remote sensing, GIS and model simulation, to promote quantitative assessment and prediction of soil legacy effect, provide support for sustainable land management and ecosystem development.

Key words: soil legacy effect; web of science database; bibliometric; visual analysis; research trend