

环境科学

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腾格里沙漠东南缘不同生境白刺(*Nitraria*)灌丛沙堆的空间分布格局

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英文关键词 [sand-mound of *Nitraria*](#) [spatial pattern](#) [sand-binding efficiency](#)

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中文摘要

运用地统计学和数量生态学方法, 从维持天然白刺灌丛稳定性和持久生态效益角度出发, 对腾格里沙漠东南缘不同生境白刺灌丛沙堆的空间异质性进行了研究, 分析了不同生境白刺固沙生态效益. 结果表明, 生境地下水埋深和白刺植株发育状况的差异直接影响了白刺耐沙埋的能力, 间接地影响了白刺沙堆的固沙效应. 湖盆低地白刺种群的植株盖度、密度和生物量显著高于山前冲积扇区 ($p < 0.01$), 植株高度则相反, 且无显著差异 ($p > 0.05$). 湖盆低地的半固定生境沙堆高度平均为1.20 m, 单个沙堆积沙体积平均为88.19 m³, 固定生境的山前冲积扇沙堆高度平均为1.14 m, 单个沙堆积沙体积平均为33.16 m³. 不同生境条件下, 白刺沙堆的斑块大小和分布存在明显差异 ($p < 0.01$). 湖盆低地的白刺灌丛沙堆趋向于大斑块、小密度, 空间自相关距离较长, 而山前冲积扇区相反. 湖盆低地由自相关因素引起的沙堆大小和积沙体积空间异质性占主要部分, 分别体现在1.2~84 m和1.2~505 m尺度; 而山前冲积扇的随机因素引起的沙堆大小和积沙体积空间异质性占到100%, 在100 m以下尺度该区白刺灌丛沙堆大小和积沙体积具有恒定的变异, 其空间分布格局在这个尺度无规律体现呈随机分布.

英文摘要

Based on the geo-statistics and quantitative ecology method, the spatial pattern of sand-mound of *Nitraria* was analyzed in different habitat at the southeastern fringe of the Tengger desert in order to keep the natural mounds stability and ecological efficiency. The results showed that the different groundwater level and plant growth condition resulted in difference of *Nitraria* population at capacity of withstanding sand bury and the effect of sand-binding. The coverage, density and biomass of *Nitraria* population at the lacustrine basin lowland were significant higher than those of the alluvial fan ($p < 0.01$). Although the height of *Nitraria* population at the lacustrine basin lowland was lower than that of the alluvial fan, there was no significant difference between two habitat ($p > 0.05$). The height and volume of sand-mound was 1.20 m and 88.19 m³ at the lacustrine basin lowland, 1.14 m and 33.16 m³ at the alluvial fan, respectively. The size and distribution of sand-mound was significant difference at different habitat ($p < 0.01$). The mound of the lacustrine basin lowland has the tendency of large patch and low density, developed longer scale pattern in auto-correlated distance, and those of the alluvial fan just the reverse. The spatial heterogeneity of mound size and volume of accumulation sand in the lacustrine basin lowland can be controlled by auto-correlated factors at 1.2-84 m scale, and the random factors at under 100 m controlled the spatial heterogeneity in the alluvial fan. Especially, the size and volume of sand-mound has constant variation at under the 100 m scale in the alluvial fan, and has random spatial pattern without law.

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