

研究论文

黄河三角洲芦苇种群特征对水深环境梯度的响应

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摘要 通过野外调查芦苇种群特征及获取的监测数据, 应用多元统计法、函数极值法以及 β 多样性指数测度法, 对黄河三角洲芦苇种群在不同环境梯度(以水深为主)条件下的生物生态学特征及 β 多样性进行了分析。

(1) 通过离差平方和聚类分析方法, 将研究区的10个调查样地划分为6个类型。随水深环境梯度变化, 各样地群落优势植物也发生相应变化。(2) 芦苇的平均高度和平均茎粗与平均水深呈显著相关。芦苇平均密度和平均盖度值与平均水深拟合曲线的变化呈非线性变化趋势。在平均水深为0.3m时, 芦苇平均密度和平均盖度出现明显的峰, 随水深变化向峰两侧递减, 而芦苇平均株高和平均茎粗随水深增加呈递增趋势。(3) 通过 β 多样性分析, 黄河三角洲存在明显的环境梯度变化, 随着水深的变化, 物种间存在明显的替代关系。通过离差平方和聚类分析后得出的各相邻样地(水深段)间的Sorensen指数值均大于不相邻样地(水深段)间的值。水生环境植物群落间的相似性程度较大, 而旱生环境植物群落间相似性程度较小。

关键词 芦苇 β 多样性 环境梯度 湿地 黄河三角洲

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The response of reed community to the environment gradient of water depth in the Yellow River Delta

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Abstract By field investigating of reed community characteristics and acquiring monitoring data, we analyzed the bio-ecological characteristics and β -diversity of reed communities in different environmental grads (mainly based on water depth) of Yellow River Delta with methods of multi-analysis, extremum analysis and β -diversity index analysis. According square sum of deviations (Ward) cluster analysis, we divide the 10 sampling plots into 6 types, the dominant plants in different plots varied with the changing of environmental gradients. After cluster analysis, it is easily to find that the dominant plants in different types of plots transformed from aquatic plants to xerophytes and salt tolerant plants with the decreasing of water depth. The average height and diameter at breast height of reeds are significantly correlated with average water depth. The fitness curves of reed average density and coverage with average water depth are nonlinear. When average water depth is 0.3m, the average density and coverage of reeds reach apex value. While the height and diameter at breast height of reeds increase with the increasing of water depth. There has obvious change of environmental gradients in Yellow River Delta. Obviously, we found that transitional communities exist in Yellow River Delta by β -diversity analysis. Vicarious species appears with the changing of water depth. The occurrence of substitute species is determined by the function of common species between adjacent belts. The different functions of common species lead to the difference of community structure and function and the difference of dominant plants. The result reflects the difference of species component in different habitats and directly reflects environmental heterogeneity. The values of β -diversity indexes of adjacent plots are higher than that of unadjacent plots. There has transition zone between xerophytes and aquatic plants in Yellow River Delta. In aquatic environment, the similarity of reed community is higher than that of xeromorphic plants. β -diversity index could reflect plant succession trends aroused by the changing of environmental gradients in Y

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ellow River Delta. β -diversity index is important in revealing plant responses to the change of environmental gradient, is helpful to acquire the change patterns of species diversity with the environmental gradient change and the evolving trends in future. It plays an important role when discussing the mechanism of environmental water requirement of wetland.

Key words reed _ β -diversity _ environmental gradient _ wetland _ Yellow River Delta

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