

研究论文

三江平原沼泽湿地枯落物分解及其营养动态

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摘要 分解袋法研究了三江平原典型沼泽湿地枯落物的分解速率和N、P营养动态。湿地枯落物的分解速率(0.000612~0.000945d⁻¹)在群落间差异显著, 分解480d, 分别损失初始重的45.36%(Carex pseudocuraica)、35.32%(Carex lasiocarpa)、33.72%(Deyeuxia angustifolia)和29.13%(Deyeuxia angustifolia-Shrub), 即随淹水深度由大到小、淹水时间由长到短, 枯落物分解由快到慢, 说明湿地的淹水状况是影响枯落物分解速率的主要因素。分解过程中, 漂筏苔草和毛果苔草枯落物N浓度持续上升, N在枯落物中积累; 小叶章枯落物N浓度在第1个月快速下降而后缓慢上升, 分解使枯落物释放N。各类枯落物P浓度的变化大致呈不同程度的降低趋势, 分解使湿地枯落物均发生P释放。结果表明, 微生物的营养需求状况决定了湿地枯落物N、P的动态变化, 而其积累或释放的强度则可能与枯落物初始C: N和C: P的大小有关。

关键词 枯落物分解 N、P动态 积累 释放 沼泽湿地 三江平原

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Decomposition and nutrient dynamics of marsh litter in the Sanjiang Plain, China

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Abstract Litter bag technique was used to study the decomposition and nutrient dynamics of marsh litter in the four communities, Carex pseudocuraica(C.pa), Carex lasiocarpa(C.la), Deyeuxia angustifolia(D.aa) and Deyeuxia angustifolia-Shrub(D.aa-Srb), in Sanjiang Plain, northeastern China. In the first year, decomposition could be divided into two periods and mass loss ranged 11.7%—31.4% of the initial mass during summer and autumn, both of which accounted for more than 75% of the annual loss. The decomposition rates ranged from 0.000612 to 0.000945 d⁻¹ depending on flooding depth and duration and were differed significantly among communities. Litter decomposed faster in communities with deeper and perennial flooding than in those with shallow and seasonal flooding. The initial ratios of C: N and C: P were also different among the four litter types, but these difference had no effect on the decomposition rates, which might suggest that flooding status rather than litter quality was the main factor influencing the decomposition rates of marsh litter. N concentrations in C.pa and C.la almost continuously increased over time and the final values were 2.8 and 2.4 times higher than the initial ones, respectively. However, nutrient dynamics in D.aa and D.aa-Srb presented another pattern, with a fast decrease during the first month and a following slow increase, and the final values were close to the initial at the end of the experiment. Litter accumulated substantial amounts of N in C.pa and C.la, while net N release from litter was observed both in D.aa and D.aa-Srb. The difference might be caused by the demand of microorganism for nutrition, and then limited by litter C: N ratios and the availability of nitrogen from soil and marsh water. In c

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ontrast to N dynamics, P concentrations of all litter types apparently decreased during the first month, then continued to decline in C.pa, remained constant in C.la and D.aa and slightly increased in D.aa-Srb. At the end of the experiment, P concentrations decreased by 56%, -5%, 47% and 24% of the initial values for C.la, C.pa, D.aa and D.aa-Srb, respectively. Net P release was observed in all marsh litter over 480 days of decomposition and the intensity of P release was different among communities which might be regulated by ratios of initial C: P. The results suggested that in the marsh with N limitation litter tended to accumulate N and release P during the decomposition and the intensity of accumulation or release was closely related to the ratios of initial C: N and C: P, respectively.

Key words litter decomposition N and P dynamics accumulate release marsh S

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