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研究论文

大米草(*Spartina anglica*)自然衰退种群对N、P添加的生态响应

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摘要 通过对外来植物大米草 (*Spartina anglica*) 自然衰退种群进行N肥、P肥和N-P复合肥不同梯度水平的添加，分析大米草的生长指标差异及其生理生态响应。结果表明：N、P添加后使大米草种群株高均有不同程度的增加，肥效强弱依次为N肥、P肥、N-P肥；叶片数、主根数及总生物量均显著增加 (p<0.05)。除N肥外，其它处理的叶片面积和厚度与对照没有显著差异。3种肥源的添加均显著提高了大米草自然衰退种群的光合速率 (p<0.05)；N和N-P肥均以高浓度效果最显著，但P肥却以中浓度效果最强；光合速率分别比对照增加19.08μmol•m^{-2}•s^{-1}、11.23 μmol•m^{-2}•s^{-1}和15.47 μmol•m^{-2}•s^{-1}；14d淡水淹没后，肥源添加使大米草自然衰退种群的SOD和POD酶活性增强；中浓度N和中浓度P添加使SOD活性增加最显著, 分别比对照增加320.74 unit•g^{-1}和134.54 unit•g^{-1}; 高浓度N和高浓度N-P肥添加使 POD酶活性最显著增加。N肥添加可以显著改善大米草自然衰退种群生长生理特性，可以推断大米草种群的衰退与我国海岸带土壤营养中N素营养的限制有一定的相关性。

关键词 大米草； 自然衰退； 营养限制； 高生长； 生理生态

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Eco-physiological responses of the declining population *Spartina anglica* to N and P fertilizer addition

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Abstract N, P and combined N-P were added to a declining population of *Spartina anglica* Hubbard in coastal China. Some growth parameters and eco-physiological responses of *S. anglica* to different treatments were documented. The fertilizer addition had a highly significant effect on the dynamics of its height-growth, the number of leaves, the number of roots and total biomass; however, only N addition had significant effect on leaf area and the leaf thickness in all fertilizer addition. For the dynamics of its height-growth, the effect of N was most apparent; the effect of N-P was not greater than those of N and P separately. The fertilizer addition treatments all enhanced the photosynthesis rate. For the three series of fertilization treatments, the highest N, highest N-P, and medium P yielded the highest photosynthetic rates. The rates were higher by 19.08 μmol•m^{-2}•s^{-1}, 15.47 μmol• m^{-2}•s^{-1} and 11.23 μmol• m^{-2}•s^{-1} than that of CK respectively. After freshwater stress for 14 days, treatments made the activity of SOD and POD increase. Effects of medium N and P was significant for SOD activity, However, POD activity of high N and N-P were distinctly higher. In a word, fertilizer addition improved the growth of declining populations of S. anglica, which indicated the decline of S. anglica was correlated with the nutriment deficiency in soil, especially lack of N.

Key words *Spartina* *anglica* _ *dieback* _ nutrient limitation _ height-growth _ eco-physiology

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