

研究论文

盐和温度胁迫对外来种互花米草 (*Spartina alterniflora*) 生理生态特性的影响

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摘要 盐浓度和环境温度是影响外来种互花米草自然分布的两大重要生态因子。在不同NaCl浓度和温度胁迫条件下, 对互花米草幼苗根部和叶片中膜脂过氧化产物丙二醛(MDA)、游离脯氨酸及可溶性糖、超氧化物歧化酶(SOD)、过氧化物酶(POD)、过氧化氢酶(CAT)的动态变化进行了测定。结果表明: 当NaCl浓度低于100 mmol·L⁻¹时, 可以促进互花米草的生长; 而NaCl浓度超过100 mmol·L⁻¹时, 互花米草可以通过提高体内保护酶(SOD、POD、CAT)活性, 增加可溶性糖和游离脯氨酸含量来适应外界盐浓度变化; 温度胁迫后, 互花米草地上和地下器官对胁迫的响应程度不同, 叶片中可溶性糖含量、CAT活性明显比根部高, 而根部SOD、POD活性比叶片中高。

关键词 [互花米草](#); [NaCl胁迫](#); [温度胁迫](#); [保护酶](#); [丙二醛](#); [游离脯氨酸](#); [可溶性糖](#)

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Effects of salt and temperature stress on ecophysiological characteristics of exotic cordgrass, *Spartina alterniflora*

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Abstract *Spartina alterniflora* is a rhizomatous perennial, native to the Atlantic and Gulf coast of North America. It was introduced to China to stabilize shorelines and increase vegetative cover in 1979; and now it flourishes in many inter-tidal zones of gulfs and the estuaries in East China. Dense growth of *Spartina alterniflora* reduces open mud feeding habitats of shore birds, and vigorously competes with native salt marsh vegetation in extended areas in South China. Salinity and temperature are two important ecological factors which affect the distribution of *S. alterniflora*. To find out how cordgrass adapts to the environmental conditions in the introduced range, we studied the dynamics of a series of important physiological components including superoxide dismutase (SOD), guaiacol peroxidase (POD), catalase (CAT), malondialdehyde (MDA), soluble sugar and free proline under different salinity and temperature stress. The results showed that low NaCl concentration (lower than 100 mmol·L⁻¹) enhanced the growth of *S. alterniflora*. On the contrary, high NaCl concentration (higher than 100 mmol·L⁻¹) inhibited the growth of *S. alterniflora*. To a certain extent, *S. alterniflora* was able to acclimate to the osmotic pressure created by external solution concentration by adjusting the activities of POD, SOD, CAT, as well as the content of free proline, soluble sugar. *S. alterniflora* varied in its responses to environment in different parts of the plant under 5 °C and 38 °C temperature stress. Compared to roots, leaves accumulated more soluble sugar; and CAT activities in leaves were higher, whereas SOD, POD activities in leaves were much lower than that in roots.

Key words [Spartina alterniflora](#) _ [salinity stress](#) _ [temperature stress](#) _ [SOD](#) _ [POD](#) _ [CAT](#) _ [MDA](#) _ [soluble sugar](#) _ [free proline](#)

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