作物学报
Acta Agronomica Sinica

作物学报 » 2011, Vol. 37 » Issue (05) :876-881 DOI: 10.3724/SP.J.1006.2011.00876

旱稻×稗草杂交后代YF2-1光合作用气体交换、叶绿素荧光和抗氧化酶系统对渗透胁迫的响应

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Response of Gas Exchange, Chlorophyll *a* Fluorescence and Anti-oxidation Enzymes Activities to Osmotic Stress in an Upland Rice Progeny YF2-1 Derived from *Oryza sativa* × *Echinochloa caudata*

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摘要 为了明确旱稻×稗草杂交后代YF2-1对渗透胁迫的耐性是否得到了改善，以YF2-1及其母本旱稻品种H65为材料，在苗期采用PEG-6000进行渗透胁迫处理，研究它们的气体交换参数、叶绿素荧光参数及抗氧化酶活性对渗透胁迫的响应。结果表明，在渗透胁迫处理下，YF2-1更能维持较高的净光合速率(P_n)和气孔导度(G_s)。这可能与YF2-1具有更好的持水能力，并能有效地通过热耗散(NPQ高)消耗过剩光能，通过高活性的抗氧化酶诱导来清除活性氧，从而避免活性氧伤害相关。的确，旱稻与稗草的远源杂交提高了旱稻对渗透胁迫的抗性。

关键词： 旱稻 远缘杂交 光合特征 渗透胁迫

Abstract: Wild species generally have higher stress resistance than cultivated crops and are utilized as the sources of stress resistance genes in stress resistance improvement of crops. In rice, its wild relatives have been used to improve photosynthesis, yield and stress resistance. YF2-1 is obtained by distant cross between *Oryza sativa* and *Echinochloa caudate*. In order to assess its osmotic stress resistance on physiological level, gas exchange, chlorophyll a fluorescence and antioxidation enzyme activities under osmotic stress simulated by PEG-6000 were studied in seedlings of upland rice YF2-1 and H65.The results showed that YF2-1 maintained higher net photosynthetic rate and stomatal conductance under osmotic stress condition, indicating YF2-1 suffered less inhibition in photosynthesis. This may be related to its higher water retaining capacity and its effective functions for high excessive light energy dispersing (higher NPQ) and higher activities of anti-oxidation enzymes SOD, POD, and CAT, effectively clearing AOS produced by excessive light energy. The result shows that the distant crossing may increase the resistance to osmotic stress in rice.

Keywords: Upland rice Distant crossing Photosynthetic characteristics Osmotic stress

Received 2010-10-09; published 2011-03-24

Fund:

本研究由国家重点基础研究发展计划(973计划)项目(2009CB118605)和国家科技支撑计划粮丰工程项目(2006BAD02A13)资助。

引用本文:

丁在松, 王春艳, 关东明, 赵凤悟, 赵明.旱稻×稗草杂交后代YF2-1光合作用气体交换、叶绿素荧光和抗氧化酶系统对渗透胁迫的响应[J] 作物学报, 2011,V37(05): 876-881

DING Zai-Song, WANG Chun-Yan, GUAN Dong-Meng, DIAO Feng-Wu, DIAO Meng.Response of Gas Exchange, Chlorophyll *a* Fluorescence and Anti-oxidation Enzymes Activities to Osmotic Stress in an Upland Rice Progeny YF2-1 Derived from *Oryza sativa* × *Echinochloa caudata*[J] Acta Agron Sin, 2011,V37(05): 876-881

链接本文:

http://211.155.251.148:8080/zwxb/CN/10.3724/SP.J.1006.2011.00876 或 http://211.155.251.148:8080/zwxb/CN/Y2011/V37/I05/876