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水稻生长、根系生理特性和ABA含量的基因型差异与耐盐性的关系

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Responses of different rice genotypes to salt stress and its relation to plant growth,root physiological characteristics and ABA content

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摘要 为进一步揭示不同基因型水稻耐盐性差异的生理机制，探明盐胁迫初期根部激素ABA对水稻耐盐性的调控机理。于2009年10月～2010年2月在严格控制水、温、光和营养元素供应的国际水稻研究所人工气候室进行水培试验。结果表明，盐胁迫条件下耐盐基因型（IR651）相对于敏感基因型（IR29）保持了更高的生物量，“稀释”了植株体内盐分离子的浓度而减轻盐胁迫。两水稻基因型盐胁迫条件下对盐分的总吸收量并无明显差异，IR651根部较强的耐盐性和较大的生物量可以储存更多的Na+，从而减少Na+向地上部的转运量。盐胁迫初期IR651根部ABA的大量合成是叶片蒸腾速率显著降低的主要原因，从而抑制了盐分离子的大量吸收，大大减轻了盐胁迫初期大量盐分离子吸收对植株造成的不可恢复性伤害。可见，盐胁迫条件下耐盐基因型较大的生物量、根的生理特性以及盐胁迫初期ABA的特有调控都大大增强了其耐盐胁迫性能，是耐盐基因型相对敏感基因型有更强耐盐胁迫能力的重要原因。

关键词： 水稻基因型 耐盐性 盐胁迫 根系生理特性 ABA含量

Abstract: To further inspect physiological mechanisms of salt tolerant ability between different rice genotypes, and reveal salt tolerant ability mechanisms of rice which was regulated by ABA content in root during early salt stress stage, a solution culture experiment was conducted at phytotron in International Rice Research Institute (IRRI) from Oct. 2009 to Feb.2010, and strictly controlled the water supply, temperature, illumination and nutrients supplying. The results showd that biomass of the tolerant genotype (IR651) is higher than that of the sensitive genotype (IR29), and the Na+ content of the tolerant genotype is diluted by higher biomass, and is lower than that of the sensitive genotype. There is no significant difference of total Na+ absorption between the sensitive and tolerant genotypes. The root biomass of the tolerant genotype is higher than that of the sensitive genotype, and amount of Na+ in roots of the tolerant genotype is higher than that of the sensitive genotype, while the amount of Na+ in shoot of the tolerant genotype is lower than that of the sensitive genotype. Because of large amount of ABA in roots of the tolerant genotype during the early salt stress stage, the stomatal conductance and transpiration effective of the tolerant genotype are decreased significantly, the Na+ absorption is inhibited by decreasing of transpiration effective, and salt stress of rice plant is alleviated at a large scale. It can be concluded that compared with the sensitive genotype, the tolerant genotype has special root physiological characteristics, higher biomass and special ABA regulation mechanisms, that ' s why the tolerant ability of the tolerant genotype is higher than that of the sensitive genotype significantly under the saline condition

Keywords: rice genotype salt tolerant ability salt stress root physiological characteristics

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