

研究论文

应用重组自交系群体检测控制水稻糙米粗蛋白和粗脂肪含量的QTL

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摘要 用协青早B/密阳46重组自交系群体及其分子连锁图谱, 及Windows QTL Cartographer 2.0的复合区间作图法和多区间作图法, 对水稻糙米蛋白质含量和粗脂肪含量进行QTL分析。检测到控制蛋白质含量的QTLs 5个 (*qPc-3*、*qPc-4*、*qPc-5*、*qPc-6*、*qPc-10*), 单个QTL对群体表型变异的贡献率为4.7%~19.4%, 联合贡献率为42.8%; 检测到控制脂肪含量的QTLs 4个 (*qLc-3*、*qLc-5*、*qLc-6*、*qLc-8*), 单个QTL对群体表型变异的贡献率为5.5%~12.0%, 联合贡献率为34.6%。在这些QTL的区间中, 第6染色体的Wx基因区域对蛋白质含量具有主效作用, 对脂肪含量具有较大作用。进一步分析和比较了相关研究结果, 讨论了研究结果对开展稻米品质性状分子标记辅助选择的意义。

关键词 [糙米蛋白质含量](#) [糙米脂肪含量](#) [数量性状座位 \(QTL\)](#) [重组自交系](#) [水稻 \(Oryza sativa L.\)](#)

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QTL Mapping of Brown Rice Protein Content and Lipid Content in A Recombinant Inbred Population of Rice

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Abstract

Protein content and lipid content are two important traits in evaluation of nutrient quality of rice. Rice is a major protein source in most rice-eating areas and protein can influence the physicochemical properties of cooked rice. Lipid also affects the cooking and eating quality of rice. The objective of this study was to identify QTLs conditioning brown rice protein content and lipid content using a recombinant inbred line (RIL) population derived from a cross between Xieqingzao B and Milyang 46 and its genetic linkage map by the composite interval mapping (CIM) and multiple interval mapping (MIM) of Windows QTL Cartographer 2.0. Five QTLs (*qPc-3*, *qPc-4*, *qPc-5*, *qPc-6*, *qPc-10*) and four QTLs (*qLc-3*, *qLc-5*, *qLc-6*, *qLc-8*) showing significant additive effects for protein content and lipid content were detected, respectively. The five QTLs for protein content collectively explained 42.8% of the phenotypic variance, with the variance explained by a single QTL ranged from 4.7% to 19.4%. The four QTLs for lipid content collectively explained 34.6% of the phenotypic variance, with the variance explained by a single QTL ranged from 5.5% to 12.0%. QTLs located in the vicinity of Wx gene on chromosome 6 displayed a major effect for protein content and a considerable effect for lipid content. Utilization of the QTL mapping on marker assisted selection for the improvement of grain quality in rice was also discussed.

Key words [Brown rice protein content](#) [Brown rice lipid content](#) [Quantitative trait loci \(QTLs\)](#) [Recombinant inbred lines](#) [Rice \(Oryza sativa L.\)](#)

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