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研究论文

簇毛麦6V染色体短臂特异分子标记的开发和应用

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摘要 为开发簇毛麦6V染色体短臂特异的分子标记，并利用这些标记对缺失系进行鉴定，选用11个RGA和17对STS引物进行多态性分析，其中1个RGA引物和1对STS引物在对普通小麦扬麦5号、簇毛麦及普通小麦-簇毛麦6VS/6AL易位系进行多态性分析时，分别检测到一条约1 000 bp和约800 bp的多态性片段，将这两个标记转化为稳定的特异性分子标记，分别命名为CINAU17-1086和CINAU18-723。运用这两对引物对一系列材料进行扩增，只有含6V染色体短臂的材料才能扩增出相应的特异条带，表明这两个标记均位于簇毛麦6VS上。进一步利用簇毛麦6VS缺失添加系、易位系将CINAU17-1086标记定位在簇毛麦6VS FL0.58与FL0.70之间，将CINAU18-723标记定位在簇毛麦6VS FL0.45与着丝粒之间。利用这两个特异标记对通过花粉辐射获得的部分簇毛麦6VS结构变异材料进行PCR鉴定，其结果与细胞学鉴定结果一致。CINAU17-1086和CINAU18-723标记可用来快速检测和追踪导入普通小麦背景中的簇毛麦6VS染色体片段，并对缺失系的断点进行了初步界定。

关键词 簇毛麦 抗病基因类似物（RGA） 位点标签序列（STS） 染色体特异分子标记 缺失系

分类号

Development and Application of Molecular Markers Specific to Chromosome 6VS of *Haynaldia villosa*

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Abstract The resistance gene of powdery mildew was introduced from Haynaldia villosa into common wheat (Triticum aestivum) and located on 6VS and designed as Pm21. In order to precisely map and clone Pm21, more molecular markers and chromosome structural variants need to be developed. RGA and STS markers, usually from expressed sequences, have proved to be very effective DNA markers. In order to development and application of molecular markers specific to chromosome 6VS of H. villosa, the DNA polymorphic analysis was performed on common wheat Yangmai 5, H. villosa and wheat-H. villosa 6VS/6AL translocation lines with 11 RGA and 17 pairs of STS primers. Two polymorphic fragments, about 1 000 bp and 800 bp, were amplified by a RGA primer Pto kin4 and a pair of STS primer, and then were cloned and sequenced, respectively. Based on the cloning sequences, two pairs of specific markers, CINAU17-1086 and CINAU18-723, were developed, and used to amplify common wheat Chinese Spring, Yangmai 5, Yangmai 158, H. villosa and T. durum-H. villosa amphiploid, wheat-H. villosa alien addition lines (1V-7V), wheat-H. villosa 6VS/6AL translocation line 92R137. The results indicated that two markers, CINAU17-1086 and CINAU18-723, were located on chromosome 6VS because only the materials with 6VS chromosome could amplify the specific patterns. Furthermore, CINAU17-1086 was located between FL0.58 and FL0.70 and CINAU18-723 between FL0.45 and centromere on chromosome 6VS by using 6VS deletion addition lines and translocation lines. The results obtained from these two markers were consistent with those from the cytogenetic identification to variant materials of chromosome 6VS obtained by radiating pollen. Therefore, CINAU17-1086 and CINAU18-723 markers could be used to rapidly detect the correspondent chromosome segments of 6V in common wheat and primarily identify the breakage points of deletion lines.

Key words Haynaldia villosa Resistance gene analog (RGA) Site tagged sequence (STS) Chromosome-specific molecular marker Deletion line

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