

植物遗传学

柱穗山羊草2C染色体诱发中国春小麦背景中黑麦1R染色体结构变异的研究

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摘要 当柱穗山羊草 (*Aegilops cylindrica* Host.) 2C染色体单体添加到普通小麦品种中国春和以中国春为背景的派生系时, 减数分裂时, 不含2C染色体的配子会发生染色体结构变异。为了制备一套黑麦1R染色体缺失系以用于定位黑麦1R染色体上的控制重要农艺性状的基因, 把一条2C染色体导入到小黑麦1R二体附加系(21" + 1R")中, 然后让这些个体(21" + 1R" + 2C', 2n = 45)自交, 以便产生1R染色体结构变异体。实验共检测了345粒F₂种子, 83粒种子带有结构变异的黑麦1R染色体(24.1%)。通过C分带和原位杂交检测, 对来自于23株F₂的46个F₃植株所带有的异常1R染色体进行了归类: 其中1RL端体为39.1%, 1RL等臂染色体为2.2%, 1RL易位系为32.6%。1RS端体为4.3%, 1RS等臂染色体为4.3%, 切点在长臂上的缺失体为2.2%。在6.5%的植株中同时含有2种类型的1R染色体结构变异。其余8.7%带有异常1R染色体的个体因为没有原位杂交结果而无法判断是属于哪种类型。已获得的1R结构变异株将有可能进一步发展成为一套可用于定位黑麦1R染色体上重要功能基因的遗传材料。另外, 还探讨了综合应用细胞学和分子标记方法鉴定易位染色体中小麦染色体片段的尝试, 并对所获结果进行了讨论。

关键词 [杀配子染色体](#) [1R染色体](#) [普通小麦](#) [染色体结构变异](#)

分类号

Inducing Rye 1R Chromosome Structural Changes in Common Wheat cv. Chinese Spring by the Gametocidal Chromosome 2C of *Aegilops cylindrica*

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Abstract

To generate 1R deletion and translocation lines, we introduced a 2C chromosome, which was derived from *Aegilops cylindrica* and was known to have a gametocidal function when added monosomically into common wheat cv. Chinese Spring (CS) and its derivative, into a wheat-rye 1R chromosome disomic addition line (CS-1R"). When the individuals with chromosome constitution 21" + 1R" + 2C' (2n = 45) were selfed, the 1R chromosome structural changes were found to be induced with high frequency (24.1%) among the progenies. By using C-banding and GISH analysis, we analyzed 1R structural changes in 46 F₃ individuals, which came from 23 F₂ plants. The rearranged 1R chromosomes in about 85% of the F₃ individuals could be characterized. This included telosome 1RL (39.1%), iso-chromosome 1RL (2.2%), whole arm translocation involving 1RL (32.6%), telosome 1RS (4.3%), iso-chromosome 1RS (4.3%), and 1R deletion mutant with break point in the long arm (2.2%). The mutant 1R lines obtained in this study will potentially be useful in mapping the chromosome locations of agronomically important genes located in 1R. This study also demonstrated that molecular markers might be used to identify wheat chromosome arm involved in translocation with 1R.

Key words [Gametocidal chromosome](#) [1R](#) [Common wheat](#) [Chromosome aberration](#)

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