

小伞山羊草 (*Aegilops umbellulata*) 恢复基因向小麦的转移

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摘要 鉴定了小伞山羊草 (*Ae. umbellulata*) 6 杂染色体的中国春添加系对 T 型细胞质雄性不育系育性的影响, 发现 UAD 能较好地恢复 T 型不育系的育性, 表明染色体 A 上携带有育性恢复基因。添加染色体 A 在提莫菲维细胞质背景中通过雄配子的传递率为 15.6%。同时进一步证明中国春不含有恢复基因。在体细胞染色体数为 42 的 331 个不育系与 UAD 的杂种衍生后代中选到 18 个可育株, 并对部分植株进行了细胞学鉴定。其中 040-5、061-1 和 061-4 与中国春的杂种 F1 的育性分离和染色体配对情况表明它们是含有来自小伞山羊草染色体 A 上的恢复基因的杂合易位系。

关键词 [小伞山羊草, T 型细胞质雄性不育, 恢复基因, 基因转移。](#)

分类号

Transfer of Restoring Gene in *Aegilops umbellulata* to Wheat

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Abstract

Six Chinese Spring-*Ae. umbellulata* addition lines (UAD, UBD, UCD, UDD, UED and UFM) were tested for their effects on the fertility of T-type male sterile lines. The disomic addition line of chromosome A (UAD) was discovered to be able to restore the fertility of T-type male sterility and C.S. was verified to be a material without any restoring gene as it is generally supposed. This result indicated that chromosome A carries gene restoring the male fertility. The male transmission frequency of added chromosome A in timopheevi cytoplasm background was about 15%.

Using the selfing fertility of the plants with timopheevi cytoplasm as marker of existing restoring genes, eighteen male fertile plants including 040-5, 061-1 and 061-4 were selected from 331 plants with 42 somatic chromosomes derived from crosses (Qu Xian Early A × UAD) and (Sumai No. 3A × UAD). The F1 fertile plants from (040-5 × C.S.) had 20.66 bivalents per OMC on the average and 30.38% PMCs with 2-4 univalents, while the corresponding sterile plants had only 8.23% PMCs with univalents. The mean meiotic chromosome pairing configurations of the F1 fertile and sterile plants of (040-5 × C.S.) were $17.55 + 3.11 + 0.68 I$ and $18.47 + 2.44 + 0.17 I$ respectively. Chromosome pairing of PMCs at MI of the F1 fertile plants from (061-4 × C.S.) was similar to that from (040-5 × C.S.). But in the former 21 ring bivalents were observed in a few PMCs and the PMCs with univalents occurred in a lower frequency. In the F1 fertile plants of (061-1 × C.S.), 73.91% PMCs had 2-4 univalents and only 26.09% OMCs had 21 bivalents. The mean meiotic configuration was $18.03 + 2.79 + 0.35 I$ for fertile plants of (061-4 × C.S.) and $17.09 + 3.04 + 1.74 I$ for that of (061-1 × C.S.). It was worth mentioning that the male sterile plants were separated from all the hybrids of 040-5, 061-1 and 061-4 with C.S. All these results demonstrated that 040-5, 061-1 and 061-4 were heterozygous spontaneous translocation lines with restoring gene from chromosome A of *Ae. umbellulata*, and 061-4 might involve a very small chromosome A fragment and 061-1 involves a larger one.

Key words [Aegilops umbellulata](#), [T-type male sterility](#), [Restoring gene](#), [Gene transfer](#)

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