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Identification of chromosome and fertility of BC₁ of pentaploid hybrid between *Elymus canadensis* and *Elymus dahuricus*

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Key words : *Elymus canadensis* , *Elymus dahuricus* , BC₁ , chromosome , fertility

Introduction In recent years , the artificial wide cross between *Elymus canadensis* ($2n=4x=28$) and *Elymus dahuricus* ($2n=6x=42$) was conducted and the interspecific hybrid F₁ was obtained successfully . It is reported that the hybrid F₁ is pentaploid ($2n=5x=35$) , and highly sterile . In order to restore fertility to hybrid F₁ , hybrid F₁ was backcrossed by recurrent parent *E. canadensis* and BC₁ plant was obtained . The chromosome number and pollen fertility , seed set of BC₁ plant were identified in this test in order to find out the cytogenetic characters and status of fertility restoration and to provide scientific basis for selection and utilization of excellent lines of cross descendants .

Materials and methods The tested materials were BC₁ plant of hybrid F₁ between *E. canadensis* and *E. dahuricus* , which was backcrossed by recurrent parent *E. canadensis* . The RTC chromosome of BC₁ was observed by improved fuchsin staining method ; the pollen fertility was observed by acetic carmine staining method ; 30 ears of BC₁ population were taken randomly in seed maturing stage , seeds and florets were counted up , seed set = (Total seeds / Total florets observed) × 100% .

Results and analysis Figure 1 showed that the RTC chromosome number of BC₁ varied , ranging from 21 to 35 , and the RTC chromosome number are 28 in above 85% of 515 cells . Results showed that the RTC chromosome number of BC₁ tend to recurrent parent *E. canadensis* , however the partial chromosome of pentaploid hybrid was lost , and the further research are needed . The fertility observation results of BC₁ plant showed that 2524 pollen were fertile in 3130 pollen , and the rate of pollen fertility reached 80.64% ; 1905 florets seeded in 2800 florets , and seed set was 68.04% . Hence it was proved that the fertility of BC₁ plant had been restored via one time backcross , and this result can provide scientific basis for selection and utilization of excellent lines of cross descendants .

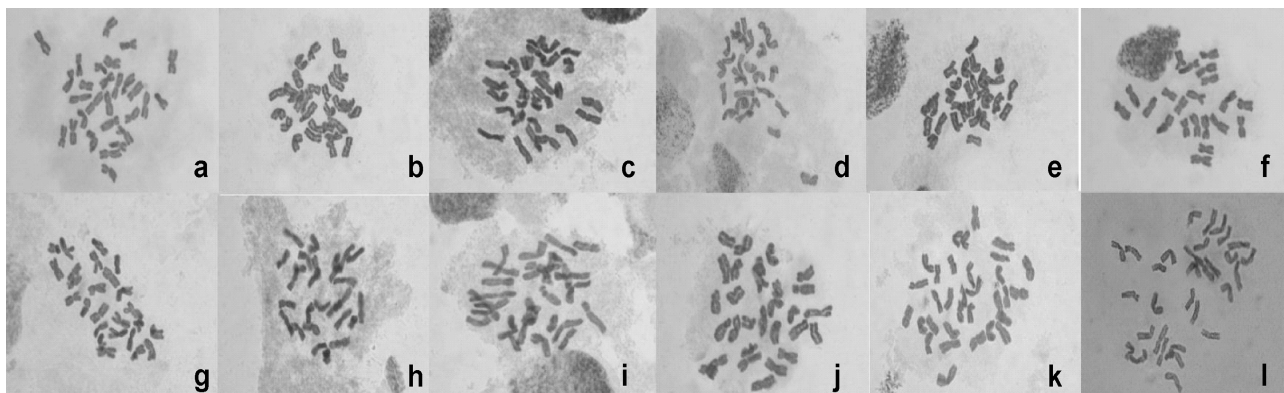


Figure 1 RTC chromosome of [*E. canadensis* × *E. dahuricus* F₁] × *E. canadensis* BC₁ plant
a b c d e . RTC chromosome number of BC₁ 2n= 28 ; f . 2n= 21 ; g . 2n= 25 ; h i . 2n= 26 ; j . 2n= 29 ; k . 2n= 35 ; l . 2n= 31 .

Conclusions The RTC chromosome number of BC₁ varied ranging from 21 to 35 , in which the chromosome number of most cells (above 85% of cells) are 28 , the RTC chromosome number of BC₁ tend to tetraploid *E. canadensis* , the effect of backcross is significant ; the pollen fertility and the seed set of BC₁ are higher , 80.64% and 68.04% , respectively , the fertility of BC₁ plant had been obviously restored .

Reference

YU Zhuo , SONG Yongfu , LI Zaozhe , et al . 2002 . Study on the growth , development and cytogenetics of *Elymus canadensis* × *E. dahuricus* hybrid F₁ [J] . *Acta Agraria Sinica* , 10(4) : 258-264 .