Plants deficient for other A-B translocations will also be tested to determine if this phenomenon is common to all of them.

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1. A test for involvement of the polar nuclei in preferential fertilization.

Roman demonstrated (1948) that sperm carrying B^A chromosomes fertilize the egg more often than the polar nuclei when in competition with other sperm. Two general explanations for this phenomenon can be proposed:

1. Sperm with B-type chromosomes are more capable of fertilizing the egg than other sperm. Either a positional advantage in the embryo sac, or a specific chemical attribute of the sperm could be responsible.
2. Sperm containing B-type chromosomes are less able to fertilize the polar nuclei. This could result from the sperm position in the embryo sac, or from a specific chemical property.

The two ideas were tested by a method which eliminates any role of the polar nuclei in fertilization and allows competition between the sperm for the egg alone. Kernels were selected in which heterofertilization had occurred, and the polar nuclei were fertilized by sperm from a different pollen grain than the egg. Both sperm from one pollen grain are therefore able to compete for the egg. If preferential fertilization persists in this situation, the first hypothesis is supported. The second explanation predicts the absence of preferential fertilization.

Crosses were made between a chromosome 9 tester and the A-B translocation, TB-9b: sh bz wx B Pl X 9^{c} sh Bz wx 9^{B}Wx B^{9}wd C sh bz. The Bz wx kernels (9,560) were selected and planted on the sand bench. Seedlings that appeared bz were transplanted to the field and grown to maturity. Presumably the endosperm was fertilized by sperm carrying

$9^{\underline{c}\ \underline{sh}\ \underline{Bz}\ \underline{wx}}$, and the embryo by sperm carrying the $9^{B\underline{Wx}}$ plus zero, one, or two $B^{9\underline{wd}\ \underline{C}\ \underline{sh}\ \underline{bz}}$'s. Confirmation of the heterofertilization was made by crossing the plants and looking for the presence of Wx and by examination of pollen fertility. (The Wx locus marks the 9^B chromosome, and crossing over between it and the translocation breakpoint occurs less than 0.5% of the time--Robertson). Each of the plants resulting from heterofertilization was crossed to c sh wx and sh bz wx testers to determine the number of B^9's present. Distinctly different testcross results are obtained from plants with 0, 1, and 2 B^9's (Robertson). A total of 45 plants was classified with the following results:

	Hyperploid TB-9b ($9\ 9^B\ B^9\ B^9$)	Hypoploid TB-9b ($9\ 9^B$)	Heterozygous TB-9b ($9\ 9^B\ B^9$)
Number of Plants	25	12	8

Plants with one B^9 may be disregarded, since both sperm of the parental pollen grain contained one B^9 and competition between sperm was not possible. The other classes, however, result from nondisjunction of the B^9 at the second pollen mitosis and fertilization of the egg either by the sperm with two B^9's (hyperploid progeny) or by the sperm lacking B^9's (hypoploid progeny). Fertilization of the egg by the sperm containing two B^9's occurred in 67% of the cases (25/37), a rate significantly higher than 50% (at the 5% level of significance). Since the normal rate of preferential fertilization with TB-9b is 65-70%, the results suggest that the polar nuclei are not involved in preferential fertilization.

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