observed when the new compound translocation is used in crosses with the a2 tester and the vp2/ps stock. The occurrence of small seeds in the latter crosses would suggest that both the long arm of chromosome one and the short arm of chromosome 5 have genes that affect seed size, and the small seeds observed are the result of the cumulative effect of these seed-size genes. Since the seeds with hypoploid endosperms from the crosses with the bz2 stock are consistently larger, there is a possibility that it carries seed-size genes in this region that are more active in the hemizygous condition than allelic genes in the a2 and vp2/ps lines. Alternatively, the bz2 stock may have modifier genes elsewhere in the genome that partially suppress the action of the hemizygous seed-size genes in the hypoploid segment.

I now have seed of this translocation available for anyone that might desire some.

Donald S. Robertson

An A-B translocation with segments from three different A chromosomes — As the preceding article indicates, it is possible to produce compound A-B translocations in which segments from two A chromosomes are attached to the B centromere. The B^A element of such compound translocations undergoes nondisjunction in the division of the generative nucleus of the pollen grain. Will nondisjunction continue to be observed if additional chromosomal material is added to the B^A chromosome?

To test this, the A-B translocation TB-2L,1S(4464) and the reciprocal translocation T2-4f were used to synthesize an A-B translocation consisting of segments from chromosomes one, two and four. TB-2L,1S(4464) was generated by crossing over between TB-1b (1S.05) and TB-2(4464) (1S.53,2L.28) and carries 48% of the short arm of chromosome 1 (1S.05-1S.53) and 72% of the long arm of chromosome two. The T2-4f translocation has breakpoints at 2L.75 and 4L.12. F_1's between TB-2L,1S (4464) and T2-4f were used to pollinate a c2 tester stock. With the proper chromosome pairing, the right crossing over (in the region between 2L.28 and 2L.75) and the right chromosomal segregation (1^B,$B^{1,2,4}$, 2^1, 4^2), a balanced microspore will be produced that carries the new tripartite A-B translocation. If this new translocation undergoes nondisjunction in the division of the generative nucleus, non-purple (yellow) seeds should be observed in the crosses with the c2 tester; these seeds would be expected to have endosperms hypoploid and embryos that were hyperploid for the new translocation. A homozygous c2 contaminant seed would be confused with one carrying the translocation. I have frequently observed

mottled seeds in crosses with c2; if the mottling was extremely weak, such seed might be mistakenly classified as a seed with a hypoploid endosperm.

Thirty putative A-B translocation seeds were planted, and twenty-three of these produced mature plants. Many of the plants were medium height, and some of these had short, pointed leaves. Eight plants were tall. All plants were examined for pollen sterility, self-pollinated and as many as possible crossed to gl3. Four of the tall plants had normal pollen and segregated for purple seeds when self-pollinated; since plants with the new compound A-B translocation would be expected to show pollen sterility, these were not tested on gl3. Of the remaining four tall plants, two were semi-sterile and two showed about 75% sterility. The crosses of these with gl3 did not segregate for the mutant. Of the eight tall plants only two did not segregate for purple seeds and were probably c2 contaminants. The yellow seeds from which the remaining six plants came were probably either the result of heterofertilization or of weak purple pigment synthesis in a C2 c2 c2 genotype. Five medium height plants that were crossed as males to gl3 segregated for glossy seedlings in a frequency expected for plants carrying an A-B translocation. Three of these five plants were semi-sterile, and two had about 75% sterility. The selfed ears of four segregated for purple seeds, while the fifth plant did not produce an ear.

On the basis of plant phenotype (medium height), pollen sterility, segregation of purple seeds on the selfed ears and segregation of gl3 in the outcrosses, it would seem reasonable to assume that these five plants carry an A-B translocation in which three segments of nonhomologous A chromosomes have been transferred to the B centromere. Attached to the B centromere are 48% of the short arm of chromosome 1 (S.05-S.53), 47% of the long arm of chromosome 2 (L.28-L.75) and 82% of the long arm of chromosome 4. Using the chromosomal unit length values given in the "Mutants of Maize," there would be attached to this centromere a segment of chromosome equal to a unit length of 192. This is approximately the length of chromosome two (196). This long segment of A chromosomal material attached to the B centromere does not seem to interfere with nondisjunction, as evidenced by the yellow seeds in the testcross on the c2 tester and by the presence of gl3 seedlings in the outcrosses of putative A-B translocation plants.

Seeds of this translocation are available.

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