

Gabay, S.J. University of Illinois, Urbana, Illinois. Recombination at the bar locus in a reverse attached-X system in *D. melanogaster*.

Recombination at the bar locus in *Drosophila melanogaster* was studied in a reverse attached-X stock synthesized by Dr. E. Novitski. The males of this stock were of the constitution $XY^{S.Y^L}$. The females of the stock carried a compound reversed metacentric X

chromosome. They were homozygous for y and B, and heterozygous for v, f and os^0 . The X chromosomes were attached at the "yellow" end rather than at the usual centromere end. This arrangement facilitates a higher frequency of homozygosis for the bar region and thus permits analysis of the marker constitution of exceptional females, that is, females which are double-bar or half-bar in phenotype. The likelihood of recovery of sister chromatids involved in exceptional events is increased as well, a prerequisite to the study of the reciprocity of intrachromosomal events.-----Exceptional females were analyzed to determine the bar genotype and the combination of marker genes carried by each of their X chromosomes. The results were interpreted in regard to exchange between obliquely synapsed members of the duplication, which is associated with exchange of outside markers and is presumed to be reciprocal. Results were also interpreted in regard to the hypothesis of intrachromosomal exchange (Laughnan, 1961) in which the markers are expected to be nonrecombinant and which proposes a reciprocal sister chromatid event.-----A total of 59,836 females, and therefore 119,672 X chromosomes, were examined for changes at the bar locus. A total of 193 recombinant exceptions was observed. Fifty-seven of these carried bar changes in both X chromosomes and were B^+/BB in genotype with the exchange of outside markers which is predicted on the basis of reciprocal products of crossing over between obliquely synapsed members of the bar duplication. The reciprocity of the exchange between obliquely synapsed duplication members was thus demonstrated. One hundred of the recombinant exceptions were of the genotype B^+/B and thirty-six were BB/B . The three classes of recombinant exceptions are expected to be equal in frequency and the discrepancy is ascribed to the reduced viability of the BB females.-----Eleven females carrying nonrecombinant exceptional strands were observed. Eight of these were half-bar in phenotype, one had round eyes and two were double-bar in phenotype. One of the BB nonrecombinant strands was recovered along with its sister strand and offered an opportunity to test the prediction that intrachromosomal exchanges between sister strands produce BB and B^+ strands as reciprocal types. Analysis showed this exceptional female to carry bar on one strand and double-bar on the other. While females of this type are not expected on the hypothesis of intrachromosomal exchange, the number of BB nonrecombinant females is insufficient to refute the hypothesis. More cases in which the nonrecombinant BB exceptional strand is recovered along with its sister are needed before any final conclusions concerning the model can be drawn.-----Four females carrying aberrations associated with bar changes were also observed. Three of these carried deletions and the fourth is still in the process of analysis.-----All 193 recombinant-exceptional females obtained from these studies exhibited normal genetic behavior in that all exceptional strands were homozygous viable. The frequency of these recombinant bar changes was one per 480 X chromosomes. The eleven females carrying nonrecombinant exceptional strands were analyzed cytologically as well as genetically and the frequency of nonaberrant changes was one per 10,000 X chromosomes. The frequency of X chromosomes carrying bar changes associated with aberrations was one per 24,000 X chromosomes.

This work submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Botany in the Graduate College of the University of Illinois, 1969.

This work was supported by National Science Foundation Grant GB-7635.

Reference: Laughnan, J.R., 1961, Mutation and Plant Breeding, NAS-NRC 891: 3-29.

Würgler, F.E. Swiss Federal Institute of Technology, Zürich, Switzerland. Synthetic female sterile factors in two combinations of X-chromosomes with $dp\ bw$; $st\ p^D$ autosomes in *D. melanogaster*.

During the last few years we tried to construct some new multipurpose stocks with marked sex-chromosomes and the autosomal markers $dp\ bw$; $st\ p^D$. The autosomes were always derived from the Inscy; $dp\ bw$; $st\ p^D$ stock obtained from I.I. Oster, Bowling Green, Ohio, USA (stock number j

419 in the 1971 stock list). In a first set of experiments (U. PETERMANN, Mutation Res. 5, 397-410, 1968) we tried to replace the Inscy chromosome by a crossover product with the markers $y\ sc^{S1}\ B\ f\ In-49\ v\ w^a\ sc^8$ ($=X^*$) obtained from females heterozygous for the following

chromosomes: y sc^{S1} B In-49 v w^a sc⁸ / sc^{S1} f In-49 v w^a sc⁸. It turned out that none of the crossover chromosomes obtained gave fertile females in combination with the dp bw ; st p^p autosomes. A similar result was recently found in an attempt to replace the Inscy chromosome by the XY(Parker 110-8) y⁷ su(w^a) w^a KS.KL y⁺ chromosome. The following table summarises our results:

Inscy/Inscy ; dp bw ; st p ^p	fertile
X [*] / Inscy ; dp bw ; st p ^p	fertile
X [*] / X [*] ; dp bw ; st p ^p	sterile
XY (Parker 110-8)/Inscy ; dp bw ; st p ^p	fertile
XY (Parker 110-8)/XY(Parker 110-8);dp bw ; st p ^p	sterile

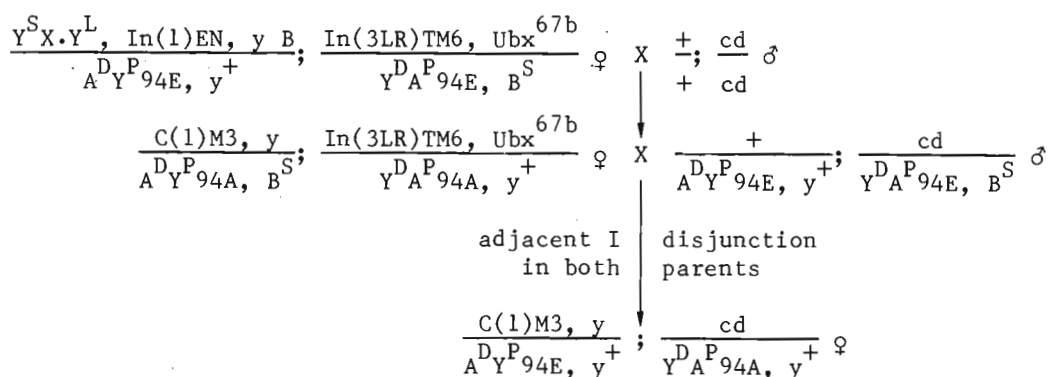
Since the X^* and the XY(Parker 110-8) in homozygous condition in combination with other autosomes (including heterozygosity for dp bw ; st p^p) give fertile females "synthetic sterility factors" seem to result in the particular combinations listed in the table. Male fertility was not affected.

Work supported by Schweizerischer Nationalfonds zur Förderung der wissenschaftlichen Forschung.

Jones, A.M. University of California,
La Jolla, California. The cytological
localization of cd and wo by means of
deficiency mapping.

X/T(Y;3)/cd males were produced using translocations B93, D100, B27, and H173 with autosomal breakpoints in 93F-94A, 94A, 94E, and 95E, respectively. These males were crossed to stock females carrying translocations with adjacent autosomal breakpoints. In this manner

it was possible to produce interstitial deficiencies for the segments between the autosomal breakpoints of the two translocations in combination with the normal third chromosome 3 carrying *cd*. These heterozygotes are recognizable on the basis of the phenotype with respect to *y*, *Hw*, *B^S*, and *Ubx* as outlined below:



The y^+y^+ (extreme hairy wing) non B phenotype of this female shows unambiguously that she carries the A^{DyP94E} and the Y^{DAP95E} elements and is therefore deficient for 94A to 94E. The fact that she has cardinal eyes places the *cd* locus between 94A and 94E. Similar crosses placed *wo* (white ocelli) in the same cytological interval. The exact status of *wo* is uncertain, however, as both *cd/cd* and *cd/wo* flies have white ocelli. By the same procedures *obt* (obtuse) and *bar-3* were found to lie outside the 94A-95E interval.

The sterility of some X/T(Y;A) males impairs the general utility of the above method; this difficulty can be circumvented by first constructing males of constitution $Y^S X \cdot Y^L / X$; autosomal recessive/autosomal balancer for use in the first generation indicated above to produce $Y^S X \cdot Y^L / T(Y;A)$ /autosomal recessive in place of X/T(Y;A)/autosomal recessive in the second generation of the crossing scheme.