It can be concluded that in these populations there is a higher frequency of heterozygotes than could be expected. For this reason one can consider a gene heterosis effect in the maintenance of these mutations which affect the eye colour.

References: Cotterman, C.W. 1954, Statistics and Mathematics in Biology, Iowa State College Press, Ames, Iowa; Dobzhansky, Th. 1952, Heterosis, J.Gowen (ed), Iowa State College Press, Ames, Iowa; Dobzhansky, Th. 1970, Genetics of the evolutionary process, Columbia University Press, New York; Najera, C. & J.L.Mensua 1983, DIS 59:94-95.

Najera, C. and R.deFrutos. Universidad de Valencia, Espana. The maintenance of variability in artificial populations. II. Frequency of inversions.

The existing knowledge of chromosome polymorphism due to the presence of inversions (Chigusa, Mettler & Mukai 1969), together with seemingly permanent linkage disequilibrium between these inversions and some isozyme genes (Mukai, Mettler & Chigusa 1971) gives occasion for numerous investigations of chromosome variants in D.melanogaster populations.

The environmental conditions which determine differences in species distribution, could also determine changes in the frequency of inversions. For example, studies of the distribution of the ecological niches of D.melanogaster and D.simulans show that the first species, more tolerant to ethanol, is distributed both inside and outside cellars but the second is found only outside cellars (McKenzie & Parson 1972,1974); in the same way D.melanogaster is polymorphic for chromosome arrangements and D.simulans is monomorphic.

A study of the inversions frequencies was made in the artificial populations described in the previous work as well as in the five strains which gave rise to these populations, to verify if the strong heterosis present could be explained by the maintenance of inversions in heterozygosis.

The inversions were analyzed through crosses with the "rucuca" strain, homozygous for standard-sequence chromosomes.

One male was crossed with two rucuca virgin females. From the offspring of the cross seven third instar larvae were collected and the giant salivary glands extracted.

A chromosomic line was considered non-carrier of inversions if in none of seven preparations observed, inversion handles appeared.

Ten crosses per population and per strain were made.

The probability of observing the two male chromosomes was $1-(1/2)^7 = 0.99$.

The method used was the conventional: stain in orcein-lactic-acetic (80-20) and squash.

The cytological nomenclature followed that of Lindsley & Grell (1968) and the breakpoints of the inversions were identified by reference to the standard map of Bridges (1935).

The inversions found and their frequency are shown in Table 1.

The mutations were not found within any of the inversions found in the strains.

Table 1. Types and frequencies of inversions in strains and populations.

STRAINS	NUMBER OF CHROMOSOMES ANALYZED	INVERSIONS	FREQUENCY % 2°	3°
2/63(wild)	20	In(2R)NS	5	
2/58A(sepia)	20	-		
1/51.3(safranin)	20	In(3R)87C-93D*		30
2/54A(cardinal)	20	-		
2/74B(cd+cn+?)	20	In(2L)t	100	

POPULATIONS	NUMBER OF CHROMOSOMES ANALYZED	TYPES AND FREQUENCIES OF INVERSIONS WITH ALCOHOL	W/O ALCHOHOL
2/63/2/58A	40	In(3R)87C-93D*--5%	
2/63/1/51.3	40		In(2R)NS--5%
2/63/2/54A	40	In(3R)P--5%	In(3R)P--5%
2/63/2/74B	40	In(2R)NS--10%	In(2R)NS--15%

* = new chromosomal inversion.

As far as the inversions found in the populations are concerned not one included the mutations studied although some are on the same chromosome. Only the cardinal mutation was just at the beginning of the inversion (3R)P, which could cause a linkage disequilibrium. Nevertheless the small inversion frequencies in these populations make this impossible in practice.

It can therefore be concluded, in general, that the strong heterosis present in these artificial populations cannot be explained by the maintenance of inversions in heterozygosis.

References: Bridges, C.B. 1935, J.Heredity 26:60-64; Chigusa,S.I., L.E.Mettler & T. Mukai 1969, Genetics 61:s10; Lindsley,D.L. & E.H.Grell 1968, Carn.Inst.Wash.Publ. 627; McKenzie,J.A. & P.A.Parsons 1972, Oecologia 10:373-388; McKenzie,J.A. & P.A.Parsons 1974, Genetics 77:385-394; Mukai,T., L.E.Mettler & S.I.Chigusa 1971, P.N.A.S. 68:1065-1069.

Novitski, E. University of Oregon, Eugene USNA. Search for a tetraploid male.

The obvious usefulness of a tetraploid line in melanogaster has led a number of us to try to put together a tetraploid male. The existence of the entire compounds for both autosomes has made this project more hopeful. In addition, we have a compound X stock with a completely functional Y chromosome at the centromere region, this point being indisputable since the compound is a tandem metacentric which generates simple rings fertile in the male without a free Y chromosome.

A triploid line was constructed with the compound X and Basc, C(1)TM, XYS.YLX,y/Basc. Such females were mated to males with two second chromosomes attached together, C(2)EN, as well as two thirds joined together, C(3)EN. It would be anticipated that some of the gametes from the female would be diploid and would carry also the Y in the compound X, and that some of the gametes of the male would have two sets of the large autosomes, and a Y chromosome. The resulting zygote from the combination of the two would be 2X2Y;4A. The small fourth chromosomes were uncontrolled, except that the triploid stock was fresh and probably carried three fourth chromosomes, in some individuals at least.

366 triploid females of the above constitution were mated to an excess of C2;C3 males. The diploid progeny included females: 148 B/+, 38 y; males: 76 w^a B, 51 + and 6 y (the latter coming from crossing over within the TM). There were 27 B/+ and 6 y intersexes, 31 B/+/+ triploids and 40 non-B triploids. A few unusual products of crossing over or non-disjunction appeared: 2 w^a B females and 2 B males.

Of particular interest of course were the possible tetraploids. These included 4 y males and 3 B males with the large wing cell size characteristic of polyploids. There also appeared one female with a highly suppressed B phenotype and unusually large wing cells which might have been 4A in autosomal composition. All these individuals proved to be sterile, and it appears likely that the males were in fact male-like interesexes (a not too common occurrence) and that the female was 3X;4A.

From these results it would appear that if such higher level polyploids are viable and fertile in melanogaster, they are not easily produced by way of these entire compounds, although it can be surmised from the types of progeny described above that the 3N females and the C(2);C(3) males both produce the required diploid gametes.

Oguma, Y., S.Akai and H.Kurokawa. University of Tsukuba, Sakura-mura, Japan. Mating behavior in D.auraria complex.

We attempted to clarify what consists of components in mating behavior and how it genetically relates to species discrimination among the four siblings of D.auraria complex. A serial studies by means of observation for successive mating behavior were conducted by using a videocorder with a small observation chamber (ϕ15mm) under a light condition (1500 lux). The principal results obtained are as follows:

1. It was preliminarily found that there were a little but critical differences in sexual maturation between the four species. D.triauraria matured somewhat faster, conversely, D.biauraria did slower than the others. The male flies of the four species, in any case, all matured sexually by 4 days after eclosion at room temperature of 25°C. We accordingly conducted thereafter the video-observation by using flies of both sexes of 4-days through 6-days old.