Heterozygotes H^r/H die, probably at the pupa stage. Nevertheless there are some scapers which die a short time after eclosion; these individuals have an extreme Hairless phenotype: they have all the bristles and hairs suppressed or substituted with abnormal sockets, furthermore their wings are reduced and with abnormal L II, L IV and L V veins (d).

Alexandrov, I.D. Research Institute of Medical Radiology, Academy of Medical Sciences of USSR, Obninsk, 249020, USSR. Comparative genetics of neutron- and γ-ray-induced lethal b, cn and vg mutations in D.melanogaster.

It is a well-known fact that neutrons are more efficient than low-LET radiations for producing lethal visibles including those unaccompanied by detectable cytological changes. This fact was interpreted to mean (Muller 1954) that neutrons more frequently than low-LET radiations induce clusters of closely linked lethal and visible mutations which are then recorded as single genetic events. When this interpretation is correct, it can be expected that, in chromosome regions saturated by clusters of closely linked lethal and visible loci, neutrons must more often than low-LET radiations produce lethal visibles that complement to give viable visible combinations. However, if lethal visibles are a kind of the minute rearrangements with pleiotropic expression, such neutron-induced mutants will have lower frequencies of complementation for the lethal phenotype compared to lethal visibles induced by low-LET radiation. To test the alternatives the complementation patterns of 12 black, 13 cinnabar, and 11 vestigal lethal mutations induced by neutrons (0.1-0.85 MeV) or γ-rays (^{60}Co) and preserved by In(2LR)SM5 were first of all investigated through inter-se crosses between each of lethal mutations within the three regions of interest. Further, the extent of deficiencies supposed were determined by testing the survival of b lethal mutations in combinations with nub and j, of cn lethal mutations--with so and blo, and of vg lethal mutations--with sca, vg^C, vg^B, 1(2)C.

Results of the 328 inter-se as well as with reference markers crosses (in toto 16 γ-ray- and 19 neutron-induced lethal visibles were analyzed) are summarized by Figs. 1-3 (irradiation-induced mutations were named by the accepted alphanumeric code). As it can be seen, 80% neutron- as well as γ-ray -induced lethal visibles fail to complement, being deletions that extend for two, three, or more genic units neighbouring the specific loci of interest.

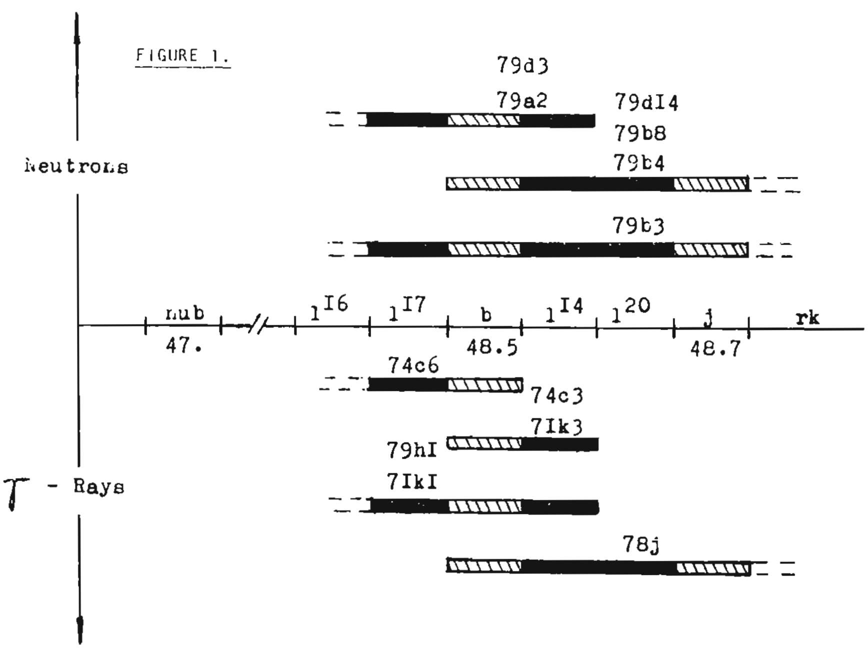

Fig. 1. Complementation map of neutron- and γ-ray-induced b lethal mutations of D.melanogaster as compared with genetic map (see for the latter Lindsley & Grell 1968; Woodruff & Ashburner 1979). Localizations determined by complementation patterns. 5 genetic units were defined. Black, affected units with lethal effects; hatched, units with visible (b or j) phenotype; dashed, further possible extension of the deletion.

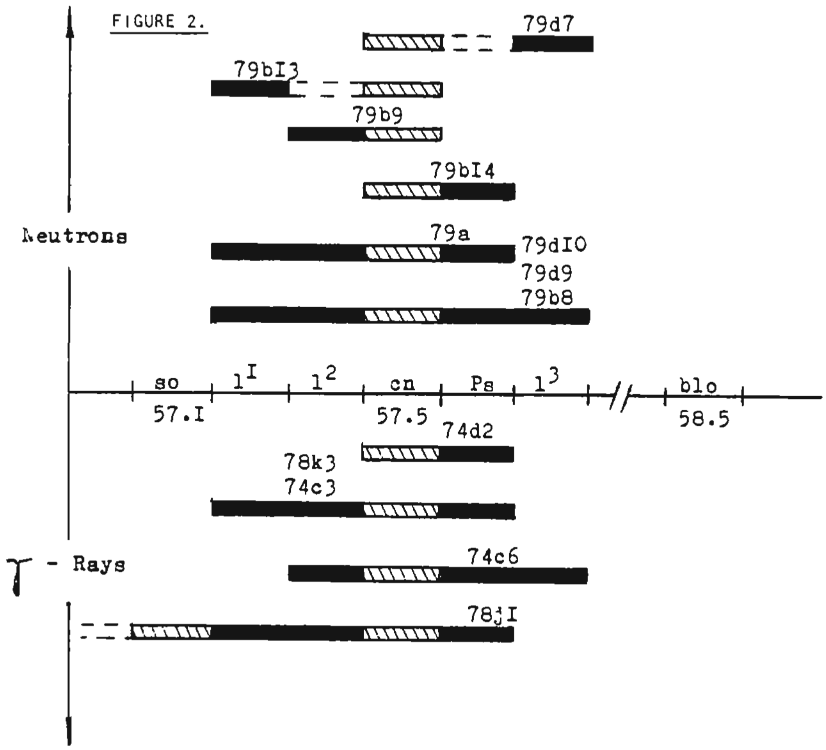

Fig. 2. Complementation map of neutron- and γ-ray-induced cn lethal mutations as compared with genetic map (see for the latter Lindsley & Grell 1968). 6 genetic units were defined. Black, affected unites with lethal effects; hatched, units with visible (so or cn) phenotype; dashed inside, inversion proposed; dashed outside, further possible extension of the deletion.

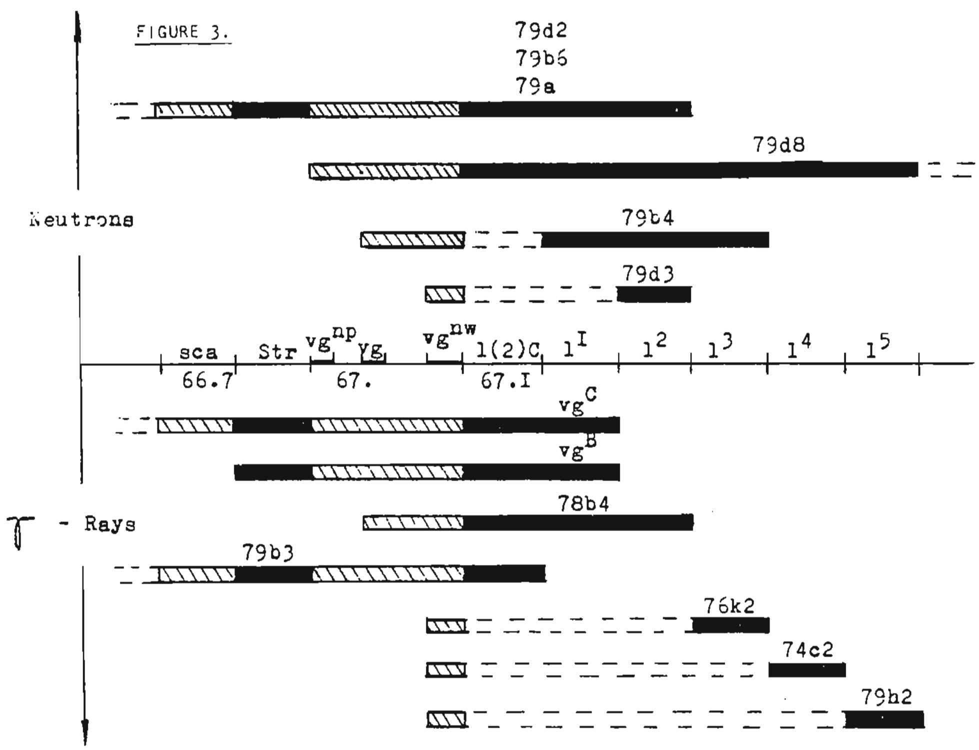

Fig. 3. Complementation map of neutron- and γ-ray-induced vg lethal mutations as compared with genetic map (see for the latter Lindsley &Grell 1968). Localizations determined by complementation patterns. 9 genetic units were defined. Black, affected units with lethal effects; hatched, units with visible (sca or vg pseudoalleles) phenotype; dashed inside, inversion proposed; dashed outside, further possible extension of the deletion.

The remaining lethal visibles appear to be a kind of inversions that complement to give rise to viable visible. It is important that after neutron irradiation lethal visible patterns for the black and cinnabar loci that do not mutate intragenically with recessive lethality are similar to that found for the vg locus mutating in this way. In the light of these data it is obvious that neutron- and γ-ray-induced lethal visibles are a kind of the minute rearrangements (deletions or inversions) with the equal size and position. Therefore, neutron-induced lethal mutations as well as mutations produced by low-LET radiation are qualitatively the same, and the differences in the genetic action of two radiations in question have a quantitative rather than a qualitative nature.

Grateful acknowledge is made to R.C. Woodruff, Bowling Green, Ohio, for supplying the nub, j, so, blo, sca, vg^B, vg^C, and l(2)C stocks.

References: Lindsley, D.L. & E.H.Grell 1968, Publ.Carnegie Inst. 627:1-471; Muller, H.F. 1954, Radiation Biology (Ed: A.Hollaender, McGraw H.V., New York), vol. 1/1:496-507; Woodruff, R.C. & M.Ashburner 1979, Genetics 92:133-149.

Alonso, A. and A.Munoz. Universidad de Cordoba, ESPANA. Biometric characterization of some wing measurement in Drosophila melanogaster.

Although genetic populations developed tremendously through Hubby & Lewontin research (1966) and due to electrophoresis techniques which enabled gene allele manifestations to be individually visualized, it is well known that not all genetic manifestations can be understood in such terms. In the field of Quantitative Genetics, the auxiliary techniques are actually mathematical methods, biometrical to be exact. The research on heredity in the wing size of D.melanogaster published by Reeve & Robinson (1953) is very interesting, although these authors, as well as others usually use only one or two variables in their studies.

More recently, Alonso & Munoz (1982) have carried out multivariant analytical studies in order to localize discriminant traits. Of course, it is difficult to find concrete studies on wing size and form in D.melanogaster through use of multivariant analysis, but these can be found for other species (Lefebvre et al. 1974; Pereira 1972; Jolicoeur et al. 1960).

Using 100 males and 100 females in each of two laboratory populations, one maintained at 25°C and the other (a replica of the former) maintained at 30°C for one generation, we have carried out the fifteen measurements indicated in Fig. 1. The methodology employed was the analysis of principle components, based on the covariance matrix, and on the correlation to obtain the factorial matrix (using the logarithmical transformation of data). The methodology has been found adequate for the idea we have pursued from the outset, which is to say, for the detection of measurements denoting size and of those indicative of the wing form of the fly, as well as for a discriminating analysis between the natural groups formed in this study; males at 25°C, males at 30°C, females at 25°C and females at 30°C. In the component

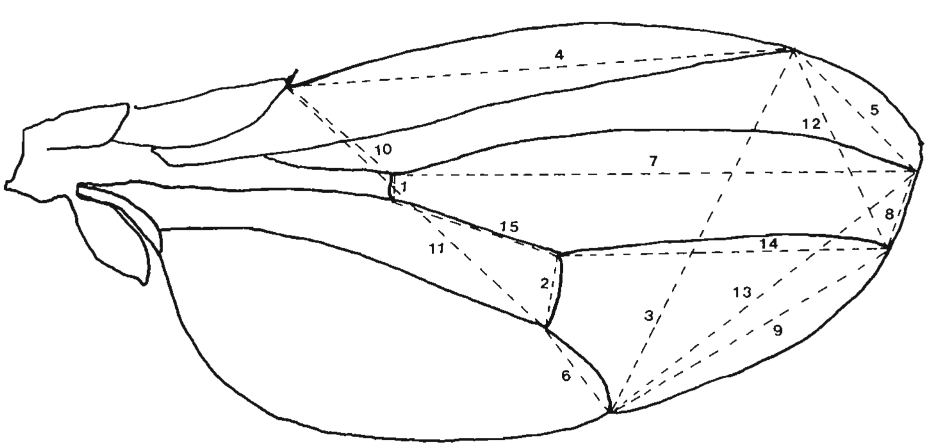

Fig. 1. Representation of the measurements taken on the Drosophila melanogaster wing.