Golubovsky, M.D. and K.B. Sokolova. Institute of Cytology and Genetics, Novosibirsk, U.S.S.R. The expression and interaction of different alleles at the 1(2)gl locus.

The mutations of 1(2)gl locus typically cause the death of homozygotes in the larval or prepupal stage. We found these lethal mutations to occur very often and persistently in Geographically isolated populations of D. melanogaster of the U.S.S.R. Is the ubiquitous occurrence of 1(2)gl mutations connected with diffusion of the only mutant allele or with the independent appearance of several? The main task was to make this question clear. If allelic lethals are non-identical in the sense of their genetic topography, it is possible to try to detect some phenotypical or genetical differences between them. Upon detailed and careful analysis of stages of the death of homozygotes we succeeded in dividing the sample of 12 alleles into four groups. Group I - larval, more than 96% of homozygotes die at the second larval instar. Group II - mainly larval, 85-90% of homozygotes die at 2nd larval stage. Group III - larval-prepupal, about 50% of homozygotes die at larval and about 50% at prepupal stage. Group IV - prepupal, more than 80% of homozygotes die at the prepupal stage. By special crosses we showed that the manifestation character of alleles is not connected with influence of genetic background. The expression and interaction of lethals from groups I, II, III and IV was studied in 10 compounds. The following preliminary conclusions may be made: 1) Compounds formed by different alleles of the same group have the same effective lethal stage. 2) Different alleles of the same group had similar type of interaction in compounds with lethals of other groups. Hence it follows that attribution of lethals to group I, II, III or IV reflects some essential genetic characters of alleles. 3) All possible types of interaction are discovered in different heteroallelic combinations: independent action of each allele, dominance of mutant with developmentally earlier expression, and on the contrary, dominance of phenotypically later allele and after all, partial interallelic complementation, leading to viability of 30-40% of heterozygotes. It is interesting that complementation was found only in combinations of lethals of group I with different lethals of any other groups: I/II, I/III, I/IV. In overpopulated cultures the complementing compounds almost all died or were detected only on the tenth day of mass flight. But we obtained the four stocks of viable flies having in each second chromosome a lethal allele of the 1(2)gl locus. So, the high frequency of these lethals in natural populations is a result of the mutation occurrence and not of diffusion. We found also that under normal conditions the lethal alleles of 1(2)gl decrease the viability of heterozygotes but under the conditions of lowered temperature (12°C) the viability of heterozygotes increases by 20%. So lethal heterozygotes on 1(2)gl mutations are strongly favored by natural selection at over-wintering period. It is possible to predict also the existence of viable compounds on different lethal alleles in natural populations.

Bennett, J. and A.M. Hathaway. Northern Illinois University, DeKalb, Illinois. Aging and behavioral correlates of the w, w^+ gene substitution.

Previous studies of the behavioral correlates of the w, w^+ substitution have shown that differences do exist (DIS 48:94). Twenty five flies of each sex from both the Oregon-R-Inbred (ORI) and Oregon-R-Inbred-white (ORI-w) strains (coisogenic except for the substitution) were observed at two and eight days of age. Flies were transferred to new culture vials on the day of eclosion and examined during their second day. They were then maintained singly in numbered vials until observed again at eight days of age. All observations were made between 9 February 1972 and 10 May 1972 from 3:00 to 5:30 p.m. Individual flies were viewed for ten minute periods in 16mm Blister™ slides (DIS 47:75). Observations were recorded on a thirteen trait checklist. Only one incidence of a behavior pattern was recorded per period no matter how frequently it recurred. In the ORI stock only total activity (sum of all recorded activity) was significantly greater at day 2 than day 8. All behaviors but one showed the same pattern but without significant differences. The ORI-w stock showed significantly higher frequencies for two behaviors, (different in each sex) at day 2, but with no consistent pattern. Total activity was not noticeably different at the two ages. Other comparisons only supported the notion that the small sample size precluded definition of the single trait differences. The observations do suggest that age interacts with the w, w^+ substitution. Perhaps the white-eyed flies mature more slowly than the wild type. That is ORI shows peak activity early (108 on day 2, 53 on day 8) and tapers off, while ORI-w is either stable or builds up more slowly (67 on day 2, 71 on day 8). Further observations are in progress.