Table. Vigorous leg shaking and abdominal twitching similar to that of Sh^5 was observed at all concentrations of phenol. It could not however be quantified manually.

Conc. of phenol(M)	Wing scissoring/minute	
	Ore-K	Sh^5
0	0	76.4±7.91
0.5	0	76.8±8.26
1.0	55.4±6.37	82.7±3.55
5.0	67.8±11.45	69.0±9.21

The frequency of wing scissoring following exposure to phenol in both normal and Sh^5 flies was measured visually using a semi-automatic recorder. The results show (Table) that wing scissoring in phenol treated flies was of the same order as that in Sh^5. Phenol was not able to accentuate wing scissoring in Sh^5 flies.

In order to rule out the possibility that phenol might act as a surface irritant, various phenol derivatives as well as some commonly known corrosive agents were used. All compounds with a benzene ring and bearing structural affinity to phenol (Benzene, Pyrocatechol, Quinol, Toluene, etc.) were found to be highly effective in inducing Shaker phenotype. Other general surface irritants such as acetic aicd, propionic acid, 1 N hydrochloric acid, 1 N sodium hydroxide, carbon tetrachloride, ammonia and acetone were found to be ineffective. Since the phenols mimic the shaker phenotype which is known to be a neurological mutant, it is possible that these substances affect the nervous system of the fly. It would be worthwhile to investigate whether phenol affected the nerve membranes thereby influencing conduction or exerted its effect on the pre- or post-synapses.

Besides abnormal shaking behaviour other interesting observations on phenol treated flies were, extended recovery time and blackening maxillary palpi under prolonged treatment. This blackening probably indicates high localized activity of the enzyme tyrosinase in these organs.

Reference: Ikeda, K. & W.D. Kaplan 1970, Proc.Natl.Acad.Sci.USA 66:765-772; Jan, Y.N., L.Y. Jan & M.J. Dennis 1977, Proc.Roy.Soc. Lond.(B) 198:87-108.

Singh, B.N. Banaras Hindu University, Varanasi, India. Non-random association of linked inversions in D. ananassae.

The present communication reports new data on the asssociations between two linked inversions namely delta (3LA) and eta (3RA) in the opposite arms of the third chromosome of D.ananassae.

In many species of Drosophila, the linked inversions show non-random associations (Levitan 1958, 1961, 1973, 1978; Levitan & Salzano 1959; Brncic 1961; Prakash 1967; Sperlich & Feuerbach-Mravlag 1974). According to Levitan (1958) the main factor in maintaining the non-random associations of inversions is natural selection which involves interaction between widely separated loci.

D.ananassae is a cosmopolitan domestic species. Natural and laboratory populations of this species are frequently polymorphic due to the presence of three cosmopolitan inversions viz., alpha, delta and eta (Shirai & Moriwaki 1952; Futch 1966; Singh 1970, 1974a, 1982, 1983a). The data on the combinations between delta and eta inversions obtained earlier show that both these inversions occur in non-random association caused due to the suppression of crossing over and epistatic gene interaction (Singh 1973, 1974b, 1983b, unpublished results).

During the present study, the data on the intrachromosomal associations were obtained from two laboratory strains maintained under laboratory conditions for several generations. The frequencies of different combinations between 3L and 3R karyotypes are presented in Table 1. The expected frequencies are calculated under the assumption of randomness of combinations. In Calcutta strain, only five combinations could be detected. There is an excess of individuals which are homozygous for ST gene order in one arm and heterozygous for inversion in the other and χ^2 test for goodness-of-fit between observed and expected values shows that the differences are significant ($P<0.005$). In Shillong strain, there is over abundance of larvae showing homo-homo and hetero-hetero associations and other combinations are deficient. The χ^2value indicates that the deviation from randomness is highly significant ($P<0.001$). Thus it is evident from the present results that the linked inversions are associated nonprandomly. The present results also indicate that there are inter-strain variations regarding the pattern of association. The variations are attributable to strain (genic) factors.

Table 1. Observed and expected associations between 3L and 3R karyotypes in laboratory strains of D.ananassae.

Karyotypes 3L / 3R		ST/ST	ST/DE	DE/DE	Total
A - Calcutta strain					
ST/ST	obs.	70	73	3	146
	exp.	79.78	63.87	2.39	
ST/ET	obs.	30	7	0	37
	exp.	20.22	16.17	0.61	
Total		100	80	3	183
χ^2 = 13.22 d.f. = 2 P < 0.005					

Karyotypes 3L / 3R		ST/ST	ST/DE	DE/DE	Total
B - Shillong strain					
ST/ST	obs.	22	16	4	42
	exp.	7.32	19.73	14.95	
ST/ET	obs.	1	46	20	67
	exp.	11.67	31.47	23.86	
ET/ET	obs.	0	0	23	23
	exp.	4.01	10.80	8.19	
Total		23	62	47	132
χ^2 = 96.84 d.f. = 4 P < 0.001					

The occurrence of non-random association of delta and eta inversions in the third chromosome of D.ananassae is probably due to differential selection involving interaction between widely separated loci which supports the hypothesis postulated by Levitan (1958).

References: Brncic,D. 1961, Genetics 46:401-406; Futch, D.G. 1966, Univ.Texas Publ. 6615:79-120; Levitan, M. 1958, Cold Spring Harb.Symp.Quant.Biol. 23:252-268; ____ 1961, Science 134:1617-1619; ____ 1973, Evolution 27:215-225; ____ 1978, Genetics 89:751-763; Levitan, M. & F.M. Salzano 1959, Heredity 13:243-248; Prakash, S. 1967, Genetics 57:385-400; Shirai, M. & D. Moriwaki 1952, DIS 26:120-121; Singh, B.N. 1970, Ind.Biol. 2:78-81; ____ 1973, Genetica 44:602-607; ____ 1974a, Cytologia 39:309-314; ____ 1974b, Caryologia 27:285-292; ____ 1982, Genetica 59:151-156; ____ 1983a, Experientia 39:99-100; ____ 1983b, Genetica (in press); Sperlich, D. & H. Feuerbach-Mravlag 1974, Evolution 28:67-75.

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P-M hybrid dysgenesis in D. melanogaster: Interaction with repair deficient mutants. I. Male recombination induction.

P-M hybrid dysgenesis is known to at least partially involve transposable P elements which can be activated in appropriate hybrid individuals. One attempt to ascertain the biochemical basis of P element control of hybrid dysgenic function involves the construction of appropriate P-M hybrids which contain mutants defective in various pathways of repair of induced genetic damage (mei and mus mutants). F_1 males containing an X-linked mei or mus mutant and containing second chromosomes heterozygous for a P chromosome and a cn bw chromosome were produced in such fashion as to be a dysgenic genotype (e.g., a P chromosome from the P stock and the cn bw and mei or mus mutant chromosomes from the female parent.

One dysgenic trait common to all P-M systems is the presence of recombinants among the progeny of dysgenic males, albeit at lower frequencies than in females. An assay of male recombination activity in dysgenic P-M males containing an X-chromosome repair deficient mutant was performed by crossing mei (or mus)/Y; P/cn bw males (constructed as above) to cn bw females and assaying for recombination among the progeny.

Three P chromosomes from diverse natural populations--T-007 (Texas), haifa[12] (Israel), N-1 (California) were tested, in addition to a control (non-P) strain, Canton-S. In addition, where feasible, two alleles at each mus/mei locus were also tested. Mei-9 defines an excursion repair defect, mei-41 and mus-101 define post-replication repair defects and mus-102 is, as yet, undefined.

Results from these crosses are presented in Table 1. None of the mei or mus mutants utilized in this report showed significant frequence of male recombination over the Canton-S control. In addition, none of the tested combinations showed a statistically significant increase or decrease in the frequency of male recombination induction over the P chromosome control for each set. It should be noted that as crosses were performed with individual males, it was possible to account for clusters (premeiotic events) in the data set. Clusters