in purine treated as compared to control mosaics. This implicates tissues in the posterior ventral parts of the larva as those responsible for lethality of XDH- (mal) and XDH^+-XDH^- (mal) flies following purine treatment.

The failure of a large fraction of XDH^+-XDH^- (mal) mosaic zygotes to survive purine selection suggests that recombination values may be underestimated in rosy experiments such as those referred to above in which mosaic recombinants are produced.

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Mutagenesis of the vestigial region of D. melanogaster.

Spontaneous mutations of vestigial are well known and include minor (nicked or notched wings), moderate (excised or antlered wings) and intense (strapped and vestigial) reductions of the wings. The vestigial region is located at 67.0 on the second chromosome. The normal allele is highly mutable with both x-rays and chemical mutagens, but there are many differences in its response to these mutagens than is the case for dumpy, a mutable multiple allelic system with numerous gradations of allelic expression.

Table 1. EMS induced vestigial phenotypes using +♂ x "12 pl"♀ (19°C)

Phenotype	Total	Complete	Mosaic
nick	= 91	6	85
notch	= 102	27	75
excised	= 22	8	14
antler	= 61	5	56
strap	= 11	1	10
vestigial	= 2	1	1

The 289 allelic vestigial phenotypes were obtained among 5380 total progeny (5.37% frequency). Only 33 transmitted (0.61%), mostly from the excised, antler and strap phenotypes.

Table 2. EMS induced vestigial phenotypes using +♂ x cm vg sf ♀ or +♂ x cn vg^{E7} sf ♀ (25°C)

Series	(vg)	Total	%	Transmitted	%
cn vg sf	18	8,521	0.211	4	0.047
cn vg^{E7} sf	17	13,570	0.125	3	0.022

Most of the 35 allelic phenotypes were excised, antlered, or strapped. The higher temperature eliminating the nicked and notched expressions of the F_1 heterozygotes.

In the first series (Table 1), wild type males fed EMS (0.0125M in 2% sucrose for 24 hours) were mated to "12 pl"/Cy females. The features of this series included an abundance of nick and notch F_1 phenotypes which are probably heterozygous penetrance effects (more abundant at 19°C than 25°C). Nevertheless, many transmitted mutants demonstrated the high frequency of mutation of vg^+ with both EMS and x-rays.

In the second series (Table 2) the EMS fed vg^+ males were mated to cn vg sf or cn vg^{E7} sf females, the cn (57.5) and sf (71.5) markers reducing the amount of modifiers compared to the "12 pl" chromosome. The vg^{E7} allele, which is homozygous normal, shows an antlered phenotype in the heteroallelic vg^{E7}/vg compound. The mutagen tests were also carried out at 25°C to reduce the penetrance of vg in the F_1 heterozygotes. The EMS induced mutants in this second series consisted of 35 fertile exceptions, 6 phenotypically complete (3 of which were gonadally normal and 3 were gonadal mosaics) and 29 phenotypically mosaic (25 of which did not transmit and 4 of which were gonadal mosaics). The phenotypes of the transmitted alleles included 5 strap alleles, one classical vestigial, and one allele similar to vg^{NO2} (with charring of the vestigial wings).

Vestigial resembles dumpy in (1) being highly mutable, (2) consisting of a range of allelic types, (3) arising mostly as mosaic phenotypes, and (4) transmitting only about 20% of its F_1 phenotypes. It differs from dumpy (1) in giving rise to more mild than extreme induced alleles, (2) in having the opposite respnose to temperature (high temperature enhances mutant dumpy expression and diminishes vestigial expression; low temperature enhances vestigial expression and diminishes dumpy expression), and (3) in being more sensitive to modifiers. Successful mutagenesis studies with vestigial demand the use of warmer temperatures (25°C to 28°C) or milder alleles to act as sifters (such as the vg^{E7} allele).

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