

Spofford, Janice B. University of Chicago, Illinois. Variegation in progeny of mothers homozygous or heterozygous for rearrangement.

Hessler (1961 Genetics 46:463-484) and Spofford (1958 Proc. 10th Int. Congr. Genet. 2:270) have both recorded that offspring receiving the  $w^m$  allele from a mother homozygous for the rearrangement

D<sub>p</sub>(1:3)<sub>w</sub><sup>m</sup> 264.58a have more eye pigment and are thus less extremely variegated than offspring of the same genotype who received their  $w^m$  allele from a mother heterozygous for the D<sub>p</sub>-bearing and a structurally normal third chromosome. This work preceded the isolation and characterization of the closely-linked Su-V (Suppressor-of-Variegation) locus, the variegation-enhancing + allele of which was present in some of the third chromosomes in these studies while the variegation-suppressing Su-V allele was present in the others. Because of the strong maternal as well as direct effect on the extent of variegation attributable to this locus, it seemed desirable to repeat the test of maternal effect of homozygosity versus heterozygosity of the duplication itself in flies of known Su-V genotype.

Accordingly, four sets of mothers were prepared from the following crosses, each initiated as 10 or more pair matings:

- 1)  $y\ w/Y; +\ Dp\ \text{♀} \times Y^L\ w\ y\cdot Y^S\ y^+ /Y; +\ Dp\ \text{♂} \rightarrow y\ w/Y; (+\ Dp/+ Dp\ \text{or} +\ Dp/+ +)\ \text{♀}$
- 2)  $y\ w/Y; +\ Dp\ \text{♀} \times y\ w/Y; Su-V\ Dp\ \text{♂} \rightarrow y\ w/Y; (+\ Dp/Su-V\ Dp\ \text{or} +\ Dp/Su-V +\ \text{or} +\ +/Su-V\ Dp)\ \text{♀}$
- 3)  $y\ w/y\ w; Su-V\ Dp\ \text{♀} \times Y^L\ w\ y\cdot Y^S\ y^+ /Y; +\ Dp\ \text{♂} \rightarrow y\ w/Y^L\ w\ y\cdot Y^S\ y^+; (Su-V\ Dp/+ Dp\ \text{or} Su-V\ Dp/+ +\ \text{or} Su-V +/+ Dp)\ \text{♀}$
- 4)  $y\ w/y\ w; Su-V\ Dp\ \text{♀} \times y\ w/Y; Su-V\ Dp\ \text{♂} \rightarrow y\ w/y\ w; (Su-V\ Dp/Su-V\ Dp\ \text{or} Su-V\ Dp/Su-V+)\ \text{♀}$

Several variegated daughters from each pair mating were themselves pair-mated with  $y\ w/Y; + +\ \text{♂}$ , all at the same time. Data from progeny of D<sub>p</sub>/D<sub>p</sub> and D<sub>p</sub>/+ sisters were analyzed. Note that, except for D<sub>p</sub> constitution, the sisters whose progenies were compared had identical sex chromosome and Su-V locus genotypes. Each pair of parents was transferred to fresh Carpenter's medium after seven days, all cultures being kept at 24°C.

Both sons and daughters were scored for presence or absence of eye pigment. A random sample of no more than 10 pigmented flies of each sex from each culture was then graded as to approximate area of eyes pigmented, on a scale ranging from 0 for only one pigmented facet on either side to 200 for full pigmentation in both eyes. The results are summarized in the following table:

Offspring (all D <sub>p</sub> /+)		D <sub>p</sub> /D <sub>p</sub> mother		D <sub>p</sub> /+ mother	Probability of difference <sup>(a)</sup>
$y\ w/Y; +$	$y\ w/Y\ \text{♀}$	av. grade % $w^m$	99.3 (84) 97.2% (141)	80.7 (116) 50.5% (301)	> .05 > .05
	$y\ w/Y\ \text{♂}$	av. grade % $w^m$	11.1 (45) 60.3% (131)	9.3 (80) 31.4% (334)	> .05 > .05
	$y\ w/Y; +$	av. grade % $w^m$	160.0 (143) 100% (244)	177.0 (190) 50.3% (435)	> .05 > .05
	$y\ w/Y\ \text{♂}$	av. grade % $w^m$	52.6 (108) 57.5% (266)**(c)	77.3 (161) 49.6% (417)	> .05 << .01
$y\ w; Su-V$	$y\ w/y\ w\ \text{♀}$	av. grade % $w^m$	30.9 (112) 90.6% (212)**	36.7 (68) 44.2% (174)	> .05 > .05
	$y\ w/Y\ \text{♂}$	av. grade % $w^m$	65.0 (109) 95.6% (183)	52.2 (58) 38.7% (191)	> .05 << .01
	$y\ w; Su-V$	av. grade % $w^m$	63.4 (67) 100% (137)	77.2 (48) 47.6% (145)	> .05 > .05
	$y\ w/Y\ \text{♂}$	av. grade % $w^m$	66.7 (58) 100% (94)	87.1 (29) 49.5% (101)	> .05 > .05

(a) Note that the expected %  $w^m$  in progeny of D<sub>p</sub>/+ mothers is half of the %  $w^m$  in progeny of D<sub>p</sub>/D<sub>p</sub> mothers. Grade differences were tested both by paired-comparison t-tests and one-way analyses of variance.

(b) In parentheses are the total numbers on which the values are based.

(c) Heterogeneity between sets derived from different initial pair matings is indicated by \*\* if at the 1% level of significance, \* if at the 5% level.

Clearly, offspring of Dp/Dp mothers are not consistently more often or more heavily pigmented than are Dp/+ offspring of Dp/+ mothers. In the two instances in which the compared values differ significantly, the differences are opposite in sense. The low penetrance of  $w^m$  in sons of  $y\ w/Y,+ Dp/Su-V$  Dp mothers is ascribable to a small number of unusually prolific sibships among a larger number of less fertile groups with high penetrance. The low penetrance in sons of Dp/+ mothers who were  $y\ w/Y\ w\ y\cdot Y\ y; Su-V/+$  may have resulted from a preponderance of Su-V +/+ Dp among the mothers employed. Otherwise, the data are easily and satisfactorily interpreted in terms of the known maternal and direct effects of both extra Y-heterochromatin and genotype at the Su-V locus.

It seems reasonable that the earlier data interpreted as evidence for a maternal effect of homozygosity versus heterozygosity of the rearrangement may also be explained as due to segregation at the Su-V locus.

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Grace, D. University of California, Los Angeles. Preliminary localization of ICR 100 induced dumpy lethals.

Three phenotypically distinct dumpy lethals, olv, ol, lv, have been tentatively localized at two specific subloci (Carlson, 1959; Southin and Carlson, 1961). These alleles express extreme

phenotypes when heterozygous with the ov<sup>1</sup> mutant. The olv mutant shows a strong wing effect, oblique (o) and a thoracic effect, vortex (v), which causes pronounced disruption of the bristle pattern and thoracic pits or eruptions. The ol mutant is expressed as a strong oblique wing effect and lv is expressed as a strong vortex effect. The olv allele has been mapped between o<sup>2</sup> and cm<sup>2</sup>. The lethals ol and lv are located between cm<sup>2</sup> and ov<sup>1</sup>. They have not been separated as they are lethal when combined in the trans configuration.

Preliminary localization of dumpy lethals induced by ICR 100, a quinacrine mustard, suggests that these alleles all map within the particular subloci previously determined (table 1). The position of these alleles was determined by a "four-point" test with respect to one dumpy allele cm<sup>2</sup> or ov<sup>1</sup> and two outside markers echinoid, ed, at 11.0 and clot c1, at 16.5. Dumpy maps at 13.0.

Tests to determine the definite location are being carried out with other alleles of the dumpy series. The crossovers which have been confirmed lend support to the theory that the dumpy complex can be separated into discrete regions which affect a predictable dumpy phenotype.

Table I: Localization of dumpy lethals.

P <sub>1</sub>	Female	P <sub>1</sub>	Male	Verified Single Crossover	Total Progeny	Curly	Map-Order
lv <sup>78</sup> /ed	ov <sup>1</sup> c1	ed	olv <sup>57</sup>	c1/Cy	1	57,815	41,398
lv <sup>35</sup> /ed	ov <sup>1</sup> c1	ed	olv <sup>57</sup>	c1/Cy	2	41,210	29,784
lv <sup>88</sup> /ed	ov <sup>2</sup> c1	ed	olv <sup>57</sup>	c1/Cy	1	74,210	56,320
ol <sup>109</sup> /ed	cm <sup>2</sup> c1	ed	olv <sup>57</sup>	c1/Cy	1	32,968	27,485
ol <sup>69</sup> /ed	cm <sup>2</sup> c1	ed	olv <sup>57</sup>	c1/Cy	4	49,373	36,720
olv <sup>1</sup> /ed	cm <sup>2</sup> c1	ed	olv <sup>57</sup>	c1/Cy			

Recombination results of ICR induced dumpy lethals:

lv = thoracic vortices, homozygous lethal  
ol = oblique wings, homozygous lethal

olv = oblique wings, thoracic vortices, homozygous lethal  
cm = thoracic comma