Third, males whose genotypes contain mei 9, mei 41 and a P chromosome are largely sterile. Less than 10% of males of this genotype are fertile, and among the fertile males, fertility is low. These effects are not observed with P mei 41, P mei 9 or mei 9 mei 41 males. It is unclear why the P mei 9 mei 41 combination leads to male sterility, especially when mei 9 appears to have no effect on k.

As to the mechanism of the k value reduction in P males containing PRR mutants, light microscopy reveals no obvious structural defects in the testis and there appear to be as numerous an amount of motile sperm as in P males themselves. Electron microscopy of spermiogenesis is in progress, but a series of "egg hatch" experiments (Table 3) reveals that the cause of the reduction in k may be due to zygote mortality, rather than a spermiogenic defect. It may be recalled that Matthews (1981) has shown that 71% of the reduction in k in T-007/ cn bw males is due to spermiogenic defects and 29% is due to dominant lethality of eggs. In the presence of PRR mutants, this "egg hatch" is drastically reduced, even in P combinations where there was little or no original k reduction. This dominant lethality defines a new hybrid dysgenesis phenotype. (Supported by Williams College Discretionary Funds and Research Corporation Funds(BS) and NSF Grant DEB-7923007 and NIEHS research development award K04-ES00087 (RCW)).

Smirnova, S.G. & E.M. Khovanova. Institute of Molecular Genetics, USSR Academy of Sciences, Moscow, USSR. Temperature effects on the activity of H-factor in Drosophila simulans.

A factor of instability, termed the H factor, has been discovered in D.simulans (Khovanova 1977). H selectively raises the somatic recombination rate in the X chromosomes of dorsal prothoracal disc cells by a factor of 5 to 10, while the frequency of somatic mosaicism in the derivatives of the eye-antennal and dorsal mesothoracal disks remains at a low level.

The H factor is localized in the X chromosome. Its activity in dorsal prothoracal disk cells rises sharply in the presence of live yeast in the cultural medium. Studies of H-carrying stocks have suggested that the activity of H may be influenced by the temperature at which the culture grows. To test this supposition, the following crosses were effected:

1) ♀♀ yw(H^-) x ♂♂ +/Y (H^-) 2) ♀♀ yw(H^-) x ♂♂ v/y (H^+)

(the H-carrying stocks are marked H^+); those without the H factor are marked H^-). Eggs laid in 4-5 hours on a medium containing live yeast were placed in a thermostat at 25°C (A series) and at 16°C (B series). Macrochaetae of the head and thorax were analyzed in F_1 females. The results are shown in the Table.

In cross (1) the rate of mosaic spots is low in the humeral region and other regions, it changes insignificantly with the temperature downshift from 25° to 15°C in the humeral region and remains practically unchanged in the other regions tested.

In cross (2) the rate of mosaic spots in the humeral region at 25°C is five times as high as in cross (1) at the same temperature. The spot rate in the other regions is no different from that in cross (1). At 16°C in cross (2) the spot rate increases significantly in the humeral regions, while in the eye-antennal and dorsal mesothoracal disk derivatives it grows 10 to 20-fold.

Table 1.

Type of cross	Series	Number of ♀♀F_1	Somatic mosaicism in humeral region		Somatic mosaicism in other regions	
			# spots	%	# spots	%
1) ♀♀yw(H^-)x ♂♂+/Y(H^-)	A(25°C)	1669	8	0.47	6	0.35
	B(16°C)	2085	22	1.05	9	0.43
2) ♀♀yw(H^-)x ♂♂v/y(H^+)	A(25°C)	1629	37	2.27	4	0.24
	B(16°C)	2477	124	5.00	107	4.32

It was hypothesized that the selective effect of the H factor in dorsal prothoracal disk cells at 25°C might be due to some distinctive features of that disk. One of them could be the time of its growth. According to Madhaven and Schneiderman, the mitotic activity of eye-antennal and dorsal mesothoracal disc cells is expressed early, as the beginning of the first larval instar, whereas the dorsal prothoracal disk cells start dividing at the beginning of the third larval instar. Presumably the activity of the H factor starts at this time. If the explanation is correct, one should expect a high rate of mosaicism for all the anlages whose mitotic activity starts later than 48 hours after hatching. A study of the rate of mosaicism in the tergite area confirmed our supposition. The development of histoblasts starts at the pupal stage, and the rate of mosaic spots in the tergite area was ten times higher in H^+ females than in H^- females. It is not possible to explain the results at 16°C as well. At this temperature the growth rate is sharply slowed down but the H factor does not seem to change the duration of its own latent period. Therefore its activity begins at an earlier stage in the development of eye-antennal and dorsal mesothoracal disks, leading to a much higher rate of mosaicism in their derivatives.

References: Khovanova, E.M. 1977, Genetics XIII:1966-1975; Madhaven, M.M. & H.A. Schneiderman 1977, Wilhelm Roux's Archiveb. 183:269-305.

Sokolowski, M.B. York University, Downsview, Ontario, Canada. Gregarious oviposition behavior in Drosophila melanogaster.

The outcome of oviposition site preferences (OSP) is a particular pattern of egg distribution which is dependent on a variety of factors affecting the complex behavior patterns of the ovipositing female. Examples of parameters which have been shown to influence oviposition site choice are temperature (Fogleman 1979), ethanol (Richmond & Gerking 1979), oviposition substrate texture (Takamura & Fuyama 1980), presence of preadult forms on the oviposition substrate (Del Solar & Palomino 1966 & Del Solar 1968) density of females (Rockwell & Grossfield 1978) and presence of adult males (Mainardi 1968, 1969; Ayala & Ayala 1969).

Gregarious oviposition is an OSP pattern which results in the eggs being distributed unevenly over the oviposition substrate. Gregarious egg-laying behavior in Drosophila pseudoobscura was reported by Del Solar & Palomino (1966). Selection for and against gregariousness in the choice of oviposition sites in D.pseudoobscura was successful indicating a genetic component to this behavior in this species (Del Solar 1968).

I have been interested in whether adults from stocks of Drosophila melanogaster known to have genetic differences in a preadult behavior (larval foraging behavior) also demonstrate differences in gregarious OSP. Before OSP for sites occupied with larvae as compared to unoccupied sites could be tested, it was necessary to determine whether gregarious OSP in Drosophila melanogaster exists. The present report documents the results of this preliminary study. The oviposition preference apparatus used was modified from the one used by Del Solar & Palomino (1966). Eight plugs (2.5 cm in diameter and .75 cm in height) of Brewer's yeast-agar medium, were placed in a petri dish (13.5 cm in diameter and 2.0 cm in height) and positioned as in Fig. 1. The plugs were darkened with charcoal (4 gm of powdered charcoal/1,000 ml of medium) so that the oviposited eggs were visible. Each plug was surrounded by a plastic ring 1.5 cm in height and 3.1 cm wide, with walls .4 cm thick. The rings utilized to ensure that the larvae remained on the plugs in which they were originally placed. The plugs were numbered and lettered 1 through 8 and either A or B, as indicated in Fig. 1.

The 4 stocks used in this study were designated W_2W_3, E_2E_3, E_2W_3 and W_2E_3. A breeding scheme that utilizes the presence of crossover suppressors to permit substitutions of intact second or third chromosome pairs from one stock into another is described in Sokolowski (1980). The reconstructed stocks were W_2E_3 and E_2W_3. The latter stock would have the same second chromosome pair as E_2E_3, but differ in having the same third pair of chromosomes as W_2W_3.

Thirty 5 day old flies (15 females and 15 males) from one of the four stocks (W_2W_3, E_2E_3, W_2E_3 and E_2W_3) were placed into the centre of the oviposition preference apparatus. Adults were left to oviposit for 24 hours (starting between 1300 and 1500 hours) under conditions of constant illumination, 23±1°C and approximately 60% relative humidity. After the oviposition period, the flies were removed and the number of eggs laid on each of the plugs was counted.