Hedrick, P.W. University of Kansas, Lawrence, Kansas. Competition experiments between D. melanogaster and D. simulans.

J.S.F. Barker tested a number of D. melanogaster strains against his ver strain of D. simulans in order to find a D. melanogaster strain of approximately equal competitive ability. He selected a yw strain that produced 45% D. melanogaster progeny when 50% of the parents were D. melanogaster.

In order to test the competitive ability of these two strains over a longer period of time, I initiated a series of serial transfer experiments. In these experiments all freshly emerged adults from several different age bottles during a certain time period were combined in a fresh bottle at the end of the time period. This procedure allows a semi-continuous population to be maintained.

Samples of the yw D. melanogaster and the ver D. simulans were obtained from Barker. An initial experiment was set up with parental D. melanogaster percentages of 10%, 50% and 90%. Unexpectedly, the D. melanogaster (Barker 1) eliminated the D. simulans (simulans 1) almost immediately (Table 1). To check these results a sample (Chicago 1) of the original yw stock was obtained from W.G. Baker. A second experiment was performed which repeated the 10% level of the first and all three levels for the second strain. Again Barker 1 eliminated simulans 1, but surprisingly Chicago 1 was eliminated by simulans 1 at 10% and 50% and greatly reduced at 90%. New samples (Barker 2, simulans 2, and Chicago 2) were obtained from both sources and a third experiment was carried out. In this experiment both the Barker 2 and Chicago 2 samples remained the same or slightly decreased in frequency from parental frequencies over a seven week period.

Table 1. Per cent D. melanogaster (yw) observed from competition with D. simulans (ver) using a serial transfer method. Values are the means of three replicates. Several initial percentages were not conducted (N.C.) each experiment.

Experiment 1	Bottle begun on Day	Initial percentage yw Barker 1, simulans 1 10%	50%	90%	Initial percentage yw 10%	50%	90%
	0	45.6	97.0	98.4	N.C.	N.C.	N.C.
	3	49.8	93.5	100.0			
	7	59.2	95.9	100.0			
	10	86.2	98.6	-			
	14	93.4	-	-			

Experiment 2		Barker 1, simulans 1 10%	50%	90%	Chicago 1, simulans 1 10%	50%	90%
	0	67.4	N.C.	N.C.	8.9	31.8	100.0
	7	59.7			1.4	5.7	38.4
	14	95.8			4.8	5.6	89.7
	21	95.8			0.0	0.0	12.5
	28	98.8			0.0	0.3	22.0

Experiment 3		Barker 2, simulans 2 10%	50%	90%	Chicago 2, simulans 2 10%	50%	90%
	0	7.1	36.8	N.C.	N.C.	58.4	93.9
	7	11.4	57.5			80.2	94.7
	14	10.3	47.5			52.5	92.1
	21	16.7	44.4			79.4	80.6
	28	13.9	61.1			63.2	90.8
	35	26.8	27.7			60.4	86.2
	42	11.2	16.5			32.6	85.5
	49	9.2	21.4			29.6	78.8

The following hypothesis explains these results and is presently being tested. The

Barker 1 sample became adapted to the different conditions in my laboratory (a different food and the change from vials to bottles are probably the most dramatic differences) before experiment 1 was conducted. This adaptation increased the "competitive ability" of Barker 1 so that it quickly eliminated simulans 1. Simulans 1 also adapted in some manner so that it could outcompete the fresh Chicago 1 sample in experiment 2. The fact that experiment 3 results were as initially predicted was because all samples were obtained simultaneously and the experiment was run immediately after they were obtained. Further support of this hypothesis comes from Barker (pers. comm.) who has found in a second one-generation test that his stock in a recent retest produced approximately 40% D. melanogaster from 50% D. melanogaster parents, a value very close to his earlier results and quite unlike mine in experiments 1 and 2.

Grossfield, J. Purdue University, Lafayette, Indiana. A non-heuristic attribute of the ERG.

In conversation with several colleagues the question of electroretinograms (ERG's) being used to trace evolutionary patterns in the genus has arisen. I wish to point out that all species of Drosophila tested to date have the same waveform and time course when ERG's are recorded under comparable conditions. This has held true over the past few years when ERG's have been cursorily checked in this laboratory for members of the melanogaster, obscura, virilis, quinaria, robusta, and annulimanna species groups. Indeed, on the basis of available information, the same is true for all Diptera, with flies such as Calliphora and Musca showing larger amplitude responses. The presence of screening or accessory pigments in the eyes of various species may change the sensitivity of the response somewhat but that would be the maximal effect expected.

Hall, J.C. University of Washington, Seattle, Washington. The failure of two alleles of c(3)G to increase frequencies of X-linked lethals.

Green (Mut. Research 10:353, 1970) has discovered a putative allele of the recombination-deficient mutant, c(3)G, picked up as a mutator gene. It is a third chromosome semidominant whose locus is absent from Df(3R) sbd^{105}--as is true for c(3)G. The frequencies of mutations at certain X chromosome loci are increased in the presence of the mutator gene in females. In addition, recombination is somewhat reduced by this mutant (M. Green, personal communication). Green's preliminary allelism tests show that females bearing the mutator and c(3)G in heterozygous condition do not generate mutations in the relatively high frequency found for the mutator in homozygous condition. This means that a) c(3)G and the mutator are alleles, but c(3)G is not a mutator; or b) c(3)G may or may not be a mutator, but it is not an allele of Green's mutant.

Both c(3)G and $c(3)G^{68}$ -- a newly arisen allele of this meiotic mutant (mei-W22 of Sandler, DIS 47, 1971, in press) -- have been directly assayed for possible mutator properties. Parry (Ph.D. Dissertation, University of Washington, 1970) found that a meiotic mutant which lowers recombination and increases nondisjunction generates increased frequencies of sex-linked lethals. Such sex-linked lethal tests were carried out for the two alleles of c(3)G, in which the treatment of X chromosomes consisted of passage of these X chromosomes through females homozygous for either meiotic mutant. For c(3)G only one of 473 treated X chromosomes carried a lethal. And for $c(3)G^{68}$ none of 553 X's had a lethal induced. In a control, seven of 931 X's recovered from $c(3)G^{+}/c(3)G^{+}$ females bore a lethal. Four of these lethals arose from one female, and three from another, so the seven lethals probably represent only two mutations, each of which occurred at an oogonial stage and was proliferated. In any event, c(3)G does not appear to be a mutator gene.

Samples of the X chromosomes passed through these three kinds of females were examined for the presence of half chromatid (mosaic) lethals (produced in high frequency by chemical mutagens -- e.g. Carlson and Southin, Genetics 48:663, 1963). If c(3)G were generating increased frequencies of such half chromatid lethals in meiosis, after chromosome replication, they would go undetected among the F_1 males in a sex-linked lethal test (defining the P generation mothers as those bearing an X chromosome balancer and an X from a c(3)G female). However, of 87 X's from c(3)G, 70 from $c(3)G^{68}$, and 292 from $c(3)G^{+}$, none was found (in the F_2) to have originally carried a half chromatid lethal.