Kuhn, D.T. Florida Technological University, Orlando. Effect of maternal age upon an aberrant sex ratio condition in a tumorous-head strain of D. melanogaster.

Most tumorous-head strains of Drosophila melanogaster are characterized by sex ratios in favor of males. However, extensive variability in sex ratio exists among samples within any of the tumorous-head strains (Kuhn 1971). Maternal age was investigated as a possible cause for this variation.

The strain used was one in which Cy/Pm balancer comprised the second chromosome pair, while the X and 3rd chromosomes were retained from tumorous-head. Individual heterokaryotypic females (1/1; Cy/Pm; h 3A/3B), aged for 1, 5, 10, 15, 20, 25 and 30 days were crossed with 3 homokaryotypic males (1/Y; Cy/Pm; h 3A/h 3A), ranging in age from 1 to 3 days. The flies were mated for 5 days in 25 x 95 mm shell vials with standard media at 25 ± 1°C. All F_1 adult flies from each cross were sexed and their karyotypes determined.

Results of this investigation are presented in Table 1. Female sterility was rather high 33.7%, and was generally associated with females from 1 to 10 days of age. Apparently many of the sterile females died by 15 days of age. Productivity was extremely low, 22.0 offspring per female. However, 50.0% of the potential offspring do not survive because Cy/Cy and Pm/Pm are lethal combinations. The average proportion of homokaryotypes, 45.7% is typical for this cross since a differential selection against homokaryotypes exists within the tumorous-head strain. Although some variations in sex ratio exist between females of different ages, no recognizable trend was established. The average sex ratio in favor of males was 55.1%, ranging from 52.6% to 56.9%. A small reduction that may have resulted from a sampling error occurred in 10 and 15 day old females. Except for those two samples, the sex ratios were extremely consistent, with homokaryotypes generally showing slightly more aberrant sex ratios. It is concluded that age of the mother does not significantly contribute to the variability noted in the sex ratio in favor of males.

Thirteen separate samples are taken during the course of this study. Percentage sex ratios for these samples were 52.4, 52.7, 52.8, 53.5, 54.1, 54.3, 54.4, 54.6, 54.9, 56.9, 59.1, 59.6 and 59.8. Since the temperature, the age of the media, the age of males, and the maternal age were well controlled, a yet to be determined variable is still operative.

Reference: Kuhn, D.T. 1971, Genetics 69:467-478.

(Table 1 on next page)

Pinsker, W. and E. Doschek. Institut für allgemeine Biologie, Vienna, Austria. Light dependence of D. subobscura - courtship and ethological isolation.

In the courtship of D. subobscura, visual signals are of vital importance. Therefore this species needs light for successful mating.

By selection, however, a strain has been obtained (see the contribution of R. Springer) which is able to reproduce in absolute darkness. In the courtship of that strain the visual signals have lost their importance in favor of tactile stimuli.

As the courtship behavior is one of the most important isolating mechanisms, experiments were made to investigate to what degree the mutant behavior of this light-independent strain would affect the isolation barriers, when its females were paired with males of the mutant "yellow" and the related species D. pseudoobscura.

	"yellow" - ♂♂		D. pseud. - ♂♂	
	n	% insem.	n	% insem.
light-independent ♀♀	200	29.5%	200	13.0%
wild-type ♀♀	300	9.3%	300	1.0%
	$\chi^2 = 32.57$		$\chi^2 = 29.47$	
	$p < 0.0005$		$p < 0.0005$	

For this purpose groups of 10 virgin females and 10 males were set up in 15 ccm plastic vials under constant illumination during 72 hours. After that time the females were dissected and examined for sperm. Equal tests were made with non-selected wild-type females for comparison.

The results are shown in the table. The percentage of the inseminated females shows that the females of the light-independent strain copulate significantly more frequently than the wild-type in both cases. That means that the isolation barriers were distinctly reduced.

From this fact may be concluded that in the non-selected wild-type strains of D. subobscura visual signals will decisively impede interspecific copulation.

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Table 1. Measurements of sex ratios, sterility, productivity, and proportion of homokaryotypes of 1/1; Cy/Pm; h 3A/3B females of various ages when individually crossed with 1/Y; Cy/Pm; h 3A/h 3A males.

♀[1] 1/1; Cy/Pm; h 3A/3B x ♂[3] 1/Y; Cy/Pm; h 3A/h 3A

♀ Age in days	♂ Age in days	% Sterility	♀ Productivity	% h 3A/3A	No. ♀♀ Productive	h 3A/h 3A ♂	♀	T	% ♂♂	h 3A/3B ♂	♀	T	% ♂♂	Totals ♂	♀	T	% ♂♂
1	1-3	48.6 51/105	20.6 1114/54	45.0 501/1114	54	281-	220=	501	56.1	340-	273=	613	55.5	621-	493=	1114	55.7
5	1-3	50.0 23/46	20.8 479/23	42.4 203/479	23	115-	88=	203	56.7	150-	126=	276	54.3	265-	214=	479	55.3
10	1-3	58.1 18/31	4.7 61/13	55.7 34/61	13	20-	14=	34	58.8	13-	14=	27	48.1	33-	28=	61	54.1
15	1-3	15.4 8/52	20.9 918/44	44.7 410/918	44	224-	186=	410	54.6	259-	249=	508	51.0	483-	435=	918	52.6
20	1-3	27.6 8/29	15.2 320/21	51.3 164/320	21	92-	72=	164	56.1	90-	66=	156	57.7	182-	138=	320	56.9
25	1-3	12.0 6/50	27.9 1226/44	47.1 577/1226	44	325-	252=	577	56.3	360-	289=	649	55.5	685-	541=	1226	55.9
30	1-3	20.9 14/67	26.8 1423/53	46.2 658/1423	53	366-	292=	658	55.6	416-	349=	765	54.4	782-	641=	1423	55.0
Totals		128/380	5541/252	2547/5541	252	1423-	1124=	2547	55.9	1628-	1366=	2994	54.4	3051-	2490=	5541	55.1