unhatched eggs scored after 24 h and again after an additional day to ensure the detection of late hatching.

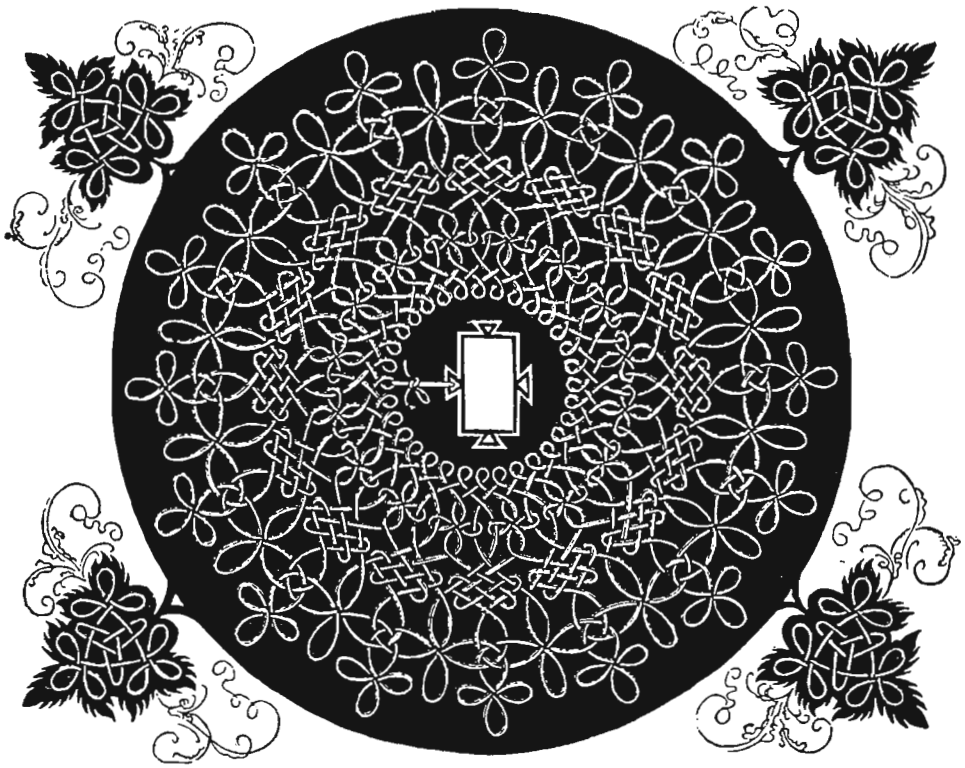
The experiments were carried out at 25°C. All cultures with 100% of unhatched eggs were discarded.

The same experimental procedure was followed when studying the effect on oocytes, except that in this case cn bw, e females were injected and mated with untreated Samarkand males.

The results thus far obtained are shown in the table and suggest that the embryonic death observed in the cultures when nipagin is used does not depend on a direct action exerted by the fungicide on Drosophila germinal cells mature at the time of treatment.

Since there was no difference between 1st and 2nd oviposition periods the data were pooled.

References: Munoz, E.R. & B. Mazar-Barnett 1978, Mutation Res. 51:37-44.



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On the effect of ethyl methane-sulphonate and chloroquine phosphate on fertility and longevity in D.melanogaster.

Thirty-five to forty virgin D.melanogaster females carrying the genetic markers dumpy (dp) black (b) cinnabar (cn) were mated with wild type (Oregon-K) males for 1-2 days at 25°C. Inseminated females were starved for 2 to 3 hours and then allowed to lay eggs on standard food medium for 2 hours. At 25°C, larval life of D.melanogaster is of 96 hours duration. For sake of treatment the larval period was divided into three equal periods. LD_{50} concentrations of ethyl methanesulphonate (EMS) and chlorquine phosphate (CHQ), determined earlier by us, were given to the developing larvae. Thus the F_1 larvae were reared on food mixed with 0.90 percent EMS in the first 32 hours and with 0.75 percent EMS in the second and third 32 hours of larval life. In other experiments

Table 1. Brood-pattern analysis of treated F_1 males and females of D. melanogaster during different parts of larval life.

Broods with progeny	Number of F_1 flies obtained from larvae treated during period					
	I		II		III	
	Males	Females	Males	Females	Males	Females
Treatments with EMS						
All broods	6	17	15	16	4	13
a,b,c,d	2	1	3	-	3	4
a,b,c,e	-	1	1	-	-	-
a,b,d,e	-	1	-	-	-	-
a,b,c	-	-	2	-	-	4
a,b,d	-	-	-	-	1	-
a,b	1	1	2	-	2	1
a,c	-	-	-	-	1	-
a	4	2	-	-	3	3
b,c	-	-	-	-	-	1
b,c,d,e	-	1	-	1	11	-
b,d	-	-	-	-	1	-
b	1	-	-	-	-	-
No Brood	4	-	-	1	1	8
Total	18	24	23	18	27	34
Treatments with CHQ						
All Broods	25	20	25	20	19	21
a,b,c,d	-	-	-	-	-	1
a,b,d,e	-	-	-	-	1	-
a,b,c	-	1	-	-	-	-
a,b	-	1	-	1	-	1
No Brood	-	-	-	1	-	-
Total	25	22	25	22	20	23

Table 2. Time of death of the treated F_1 flies* of D. melanogaster selected for obtaining broods.

Chemical	Brood** at which fly died	Number of flies died after treatment to larvae during period			
		I		III	
		Males	Females	Males	Females
EMS	a	6	0	1	2
	b	1	0	0	3
	c	0	0	1	1
	d	0	1	2	1
	Total	7	1	4	7
CHQ	b	0	1	0	1
	c	0	1	0	0
	d	0	0	0	1
	Total	0	2	0	2

* Total number of F_1 flies selected for obtaining broods is given in Table 1.
**The brood indicated yielded the progeny.

the F_1 larvae were treated with 0.185 percent CHQ in the first 32 hours, with 0.165 percent CHQ in the second 32 hours and 0.180 percent CHQ in the third 32 hours of larval life. The frequency of F_1 eggs that developed upto the adult stage in these experiments was very close to 50 percent with EMS and CHQ. Experiments were also conducted where no EMS or CHQ was fed to the developing larvae.

Effect on fertility. Brood-pattern technique was used to study fertility of F_1 adults. For this, a two-day old F_1 male was crossed every 3 days to 3 to 4 fresh virgin dp b cn females to obtain five broods. Similarly, a two-day old F_1 virgin female was crossed to 3 to 4 dp b cn males and all flies were transferred every 3 days to fresh food vials to have five broods. Separate records were maintained for each of the untreated and treated F_1 male and female for its ability to yield the desired number of broods. In the control experiments, 20 F_1 males and the same number of F_1 females were selected at random for every one of the three larval periods. All the individuals in these experiments produced progenies in all the five 3-day broods. Brood-pattern of treated F_1 males and females is given in Table 1. All the F_1 individuals that were selected after treatment with EMS or CHQ did not yield the desired number of five 3-day broods. The individuals that gave progeny in all the five broods were considered as fully fertile, those that yield progeny in one to four broods as partially sterile and others that yielded progeny in no brood as completely sterile. The number of flies obtained from a partially sterile F_1 individual was less than that obtained from a fully fertile individual depending upon the number of broods missing. This indicated that sterility was induced in some of the treated flies. Completely and partially sterile individuals were found more frequently after treatment with EMS than with CHQ (Table 1). It has been suggested

that mechanisms for inducing chromosome breaks may lead to sterility (Woodruff & Thompson 1977). Considerable degree of sterility observed in the present experiments may also be the result of chromosome breaks induced by EMS and CHQ.

Effect on longevity. In the control experiments, no F_1 male or female died before completing the desired number of five 3-day broods. No F_1 male or female Drosophila died before giving the desired number of broods when treatments with EMS or CHQ were given during the second period of larval life. Whereas 7 F_1 males died in various broods in the first period and 4 died in the third period with EMS, no F_1 male died with CHQ during these periods before completing five broods (Table 2). Only one F_1 female died with EMS in broods d in the first period and 7 died in various broods in the third period; the number of F_1 females that died owing to CHQ was 2 in each of these periods (Table 2). In case of both EMS and CHQ, the LD_{50} concentrations were used. This means that the percent egg-to-adult development obtained after treatment with either of these chemicals during any part of the larval life led to 50 percent mortality. Induction of greater degree of complete sterility, partial sterility and decrease in longevity subsequent to treatment with EMS than with CHQ may be attributed to prolonged residual effect of the probe, EMS.

Reference: Woodruff, R.C. & J.N. Thompson, Jr. 1977, Heredity 38:291.

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Relative effectiveness of ethyl methanesulphonate and chloroquine phosphate in egg-to-adult development of D. melanogaster.

Table 1. Effect of EMS and CHQ on egg-to-adult development of D. melanogaster

Chemical conc. (%)	Percent egg-to-adult development in larvae treated during period			
	control	I	II	III
EMS				
0.25	100(162)	85.4(96)	84.1(95)	85.3(159)
0.50	100(125)	71.0(129)	64.3(83)	76.0(114)
0.75	100(77)	58.5(94)	50.2(77)	41.6(108)
1.00	100(156)	47.7(130)	32.5(150)	32.8(165)
CHQ				
0.0645	100(80)	82.4(114)	81.0(100)	83.3(96)
0.0967	100(97)	71.2(108)	66.6(99)	76.4(110)
0.1290	100(110)	67.2(110)	59.2(81)	64.0(86)
0.1612	100(75)	58.8(90)	55.0(120)	55.5(81)
0.1935	100(75)	46.6(90)	43.8(105)	45.5(90)

Figures in parentheses indicate number of eggs laid.

Table 2. Determination of LD_{50} values for EMS and CHQ through least square regression line analysis.

Chemical	Treatment period	Least square regression line	LD_{50} (%)
EMS	I	$Y = -52.60X + 98.82$	0.90
	II	$Y = -67.56X + 99.99$	0.75
	III	$Y = -71.24X + 102.75$	0.75
CHQ	I	$Y = -17.30X + 53.20$	0.185
	II	$Y = -18.48X + 53.12$	0.165
	III	$Y = -18.28X + 53.30$	0.180

Four concentrations of ethyl methanesulphonate (EMS)--0.25, 0.50, 0.75, and 1.00 percent--and five concentrations of chloroquine phosphate (CHQ)--0.0645, 0.0967, 0.1290, 0.1612 and 0.1935--were used to determine their effect on egg-to-adult development when fed to D. melanogaster larvae. One ml solution of a particular concentration of EMS or CHQ was mixed to 9 g of food medium. Thus the concentrations of the chemicals available to the developing larvae were one-tenths of the concentrations prepared. The experiments were conducted at 25°C. At this temperature total larval life is of 96 hours duration. As it was desired to determine the effect in different stages of larval development, the larval period was divided into three equal parts. The information on egg-to-adult development is given in Table 1.

The actual egg-to-adult development values for controls, run along with 0.25% and 0.50% EMS treatments, were 98.7% and 99.2% respectively. In order to compare these results with those of the remaining treatments, the egg-to-adult development for these controls was assumed to be 100 percent and the corresponding values for these EMS treatments in the three parts of larval life were corrected accordingly.

The three periods of larval life of D. melanogaster gave a weak differential response to treatment with the