

Oshima, C. National Institute of Genetics, Misima, Japan. Frequencies of intra- and interpopulational allelisms of lethals in the several natural populations and the relationship between the dispersal of flies and the frequency of allelism of lethals in a natural population.

In late October of 1967, a particular collection of *D. melanogaster* was carried out simultaneously at four sites in Katsunuma and one site in Kofu, both were located in the central part of Japan. The distances between four sites, A, B, C and D, were relatively short, from 430 to 950 meters, and the distance between any of them and site E in Kofu was about 14 kilometers. The allelism test was

performed by intercrossing 112 Cy/lethal balanced strains, whose lethal chromosomes were extracted from the above 5 natural populations. From the results of a total of 6,216 crosses, the frequencies of intra- and interpopulational allelisms were obtained as shown in Table 1.

Table 1. Frequencies of intrapopulational and interpopulational allelisms of the lethal chromosomes.

Locality	Popu- lation	No. of lethal chromo- somes	Frequency of intra- populational allelism	Popu- lation	Distance between popu- lations	Frequency of inter- populational allelism
Katsu- numa	A	34	5.35%	A-B	430m	5.34%
	B	27	3.70	B-C	450	4.40
	C	16	2.50	C-D	450	5.00
	D	25	13.33	B-D	630	6.81
				A-C	880	5.70
				A-D	950	8.82
	Mean		6.22%		632m	6.01%
Kofu	E	10	6.67	E-A	14,000m	6.47
				E-B	14,000	7.04
				E-C	14,000	3.75
				E-D	14,000	9.60
Total		112		Mean	14,000	6.72%

Overall frequency of allelism = 6.44%

The overall frequency of allelism (6.44%) was the highest among those obtained for the past five years, and the similar frequencies found in the intra- and interpopulational allelisms may be attributed to high frequent and widespread lethals. Most of them appeared to have been lethals persisting for a long time in the natural populations. Either such lethals were transplanted from one population to another by recurrent migration or have already persisted independently, in those populations examined, though both possibilities are not necessarily mutually exclusive.

At the beginning of October 1968, *Drosophila* were collected in Katsunuma by 10 traps containing a mixture of banana and yeast. These traps were put almost linearly at intervals of 30 meters from the first one which was set up in a large natural population of *D. melanogaster*. All flies in these traps were caught by a net four times for the 24 hours, but only a certain number of flies were sampled from the first trap. Flies totaled 2,699 and the number of *D. melanogaster* was 2,039 (75.5%). The dispersal of males appeared to be greater than females because the mean sex-ratio (2.16) of flies collected from the second to the tenth trap was greater than the sex-ratio of flies collected in the large population (1.08). The dispersal of the natural populations seemed to decrease linearly with the square root of distance.

Among 1,330 males, 611 were mated with virgin Cy/Pm females and viabilities of homozygotes for each of 571 second chromosome were estimated in the F₃ generation. 87 chromosomes (15.2%) carried a lethal gene and 4 chromosomes among them were identified with at least two different lethal genes. Among a total of 91 lethal genes observed as above, 58 (63%) lethals were high frequent ones and classified into 14 allelic groups; the other 33 (37%) lethals were single ones. In the half diallel cross between these lethal strains, 143 crosses among 3,741 crosses were allelic, with a frequency of 3.82 per cent. The frequencies of allelism between lethal chromosomes isolated from flies collected from the same and different traps were obtained as represented in Table 2.

Table 2. The number of flies of *D. melanogaster* collected from the traps and the number of lethal second chromosomes isolated and the crosses in the allelism test grouped according to the distance between the traps from which the tested lethals were obtained.

Trap	D. melano- gaster		No. of second chromo- somes isolated	No. of lethal chromo- somes	Distance (meters)	No. of crosses	No. of allelic crosses	Frequency of allelism	Mean (%)
	♀	♂							
1	230	249	88	5	0	647	29	4.48	4.63
2	139	342	103	20	30	1,173	56	4.77	
3	100	245	101	16	60	936	33	3.52	3.33
4	118	237	95	21	90	572	18	3.14	
5	42	91	73	13	120	293	4	1.37	1.64
6	17	33	44	9	150	105	2	1.90	
7	8	17							
8	26	42	37	1					
9	29	72	30	2					
10	0	2	0	-					
Total	709	1,330	571					Overall frequency of allelism = 3.82%	

The relationship between the dispersal of flies and the frequency of allelism of lethals in a natural population was found to be similar as B. Wallace reported (1966, Amer. Nat. 100: 565-578) in a tropical population of the same species.

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Collections were made during the period July 1965 to March 1966 at Chandraprabha, Chakia forest, which is situated about forty-five miles southeast of Varanasi, Uttar Pradesh. A total of 2043 specimens were collected comprising seventeen species. Among them,

Cacoxenus punctatus, *Leucophenga albicincta*, *Leucophenga guttiventris*, *D. seguyi* and *D. trisetosa* are newly recorded from India, whereas *D. Chandraprabhiana*, *D. silvalineata*, *D. paratriangulata* and *D. latifshahi*, all belonging to the subgenus *Scaptodrosophila*, are new species.

Species	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	Total
<i>Cacoxenus punctatus</i>	-	10	13	5	7	9	-	-	-	44
<i>Leucophenga albicincta</i>	-	-	-	1	-	2	2	9	-	14
<i>L. guttiventris</i>	-	-	-	2	1	-	-	-	-	3
<i>D. seguyi</i>	27	49	132	278	91	55	63	39	3	737
<i>D. raychaudhurii</i>	8	14	12	9	-	-	-	-	-	43
<i>D. takahashii</i>	-	-	-	-	-	3	9	7	-	19
<i>D. kikkawai</i>	7	4	2	7	-	-	-	-	-	20
<i>D. bipectinata</i>	-	-	15	20	-	-	-	-	-	35
<i>D. malerkotliana</i>	78	245	94	304	35	-	-	-	-	756
<i>D. melanogaster</i>	-	-	-	-	8	9	4	3	4	28
<i>D. Chandraprabhiana</i> sp. nov.	8	6	8	-	-	-	-	19	75	116
<i>D. silvalineata</i> sp. nov.	-	-	2	-	-	-	-	2	124	128
<i>D. paratriangulata</i> sp. nov.	9	12	1	-	-	-	-	-	-	22
<i>D. latifshahi</i> sp. nov.	-	4	1	13	-	-	-	-	-	18
<i>D. trisetosa</i>	-	-	-	-	1	-	-	-	-	1
<i>D. nasuta</i>	2	5	1	48	-	-	-	-	-	56
<i>D. busckii</i>	-	-	-	-	-	-	-	3	-	3
Total	139	349	281	687	143	78	78	82	206	2043

Collection records of *Drosophila* species collected from a forest, 45 miles S-E of Varanasi, India, July 1965 - March 1966.