O'Brien, S. J. Cornell University, Ithaca, New York. Genetics of malic dehydrogenase-one in D. melanogaster.

Single adults were employed in this investigation although equivalent amounts of activity were observed in larvae, pupae, and adults. Methods for demonstrating the enzyme have been described previously (O'Brien, Isozyme Bulletin 1: 40, 1968). Lines homozygous for each allele were extracted from a polymorphic Mt. Sterling, Ohio stock (See New mutants D.I.S. this issue). Reciprocal crosses between the alternate strains revealed an autosomal, monogenic mode of inheritance for the electrophoretic variants.

Multiply marked stocks which were homozygous for Mdh-1^A were utilized in localizing Mdh-1 to a specific chromosome. Mdh-1^A/Mdh-1^B heterozygotes in all cases demonstrated segregation of Mdh-1^B from second chromosome markers in the coupling phase with Mdh-1^A (See Table 1). Similarly Mdh-1^B exhibited independent assortment with third chromosome markers also in coupling phase with Mdh-1^A. Hence, we concluded that Mdh-1 is located on chromosome II.

To map the gene, zymograms of recombinant progeny of the appropriate testcross viz: + + + + + + + + (Mdh-1^B)/ al dp b pr cn c px sp (Mdh-1^A) x al dp b pr cn c px sp (Mdh-1^A) were examined to determine the locus of Mdh-1. It was found to be between dp and b (See Table 1). Accordingly, then, large numbers of recombinants between dp and b were scored for their Mdh-1 phenotypes. The results are presented in the last two rows of Table 1. 62.7% of the crossovers occurred between dp and Mdh-1 and 37.3% occurred between Mdh-1 and b. 37.3% of the map distance between dp (II-13) and b (II-45.5) is approximately 13.2 map units from b. Hence, Mdh-1 lies at 35.3 ± 2.2 map units on chromosome II.

Table 1

Test Cross Progeny

Recombinant Chromosomes								Mdh-1^A	Mdh-1^B
+	+	+	+	+	+	+	+	0	5
al	dp	b	pr	cn	c	px	sp	5	0
al	+	+	+	+	+	+	+	0	5
+	dp	b	pr	cn	c	px	sp	3	0
al	dp	+	+	+	+	+	+	5	3
+	+	b	pr	cn	c	px	sp	4	6
al	dp	b	+	+	+	+	+	2	0
+	+	+	pr	cn	c	px	sp	0	2
al	dp	b	pr	+	+	+	+	2	0
al	dp	b	pr	cn	+	+	+	6	0
+	+	+	+	+	c	px	sp	0	8
al	dp	b	pr	cn	c	+	+	2	0
+	+	+	+	+	+	px	sp	0	10
al	dp	b	pr	cn	c	px	+	2	0
+	+	+	+	+	+	+	sp	0	4
dp	+							31	60
+	b							81	53

Spiess, E. B. and S. Prakash. D. persimilis frequencies of gene arrangements in Miranda, California.

During August, 1968, one weeks' collection at two sites near Miranda, California, namely at Fish and Salmon Creek (tributaries of the Eel River) gave the following third chromosome arrangement frequencies:

KL	MD	RD	WT	CO	HU	ST	Chromosomes obs'd	Locality
203	94	3	2	3	1	4	310	Fish Creek
167	59	2	2	1	1	0	232	Salmon Creek

The finding of the Redwoods and Humboldt arrangements confirms observations of 1964 that these rare forms are probably stabilized at low frequencies in this population. (Am. Naturalist 99: 423-425, 1965)