It is suggested that temperature may influence the local number of flies: lower temperature may diminish their sexual drive as suggested by Begon (1976) and high summer temperatures may possibly sterilize the females. This last suggestion is supported by the fact that no sperm cells were found in the spermathecae of females collected in late spring. To account for the deviation of the 1:1 sex ratio we suggest the possibility that females look for better habitats in order to oviposite their fertilized eggs. This would explain the higher percentage of males trapped near habitats were no other vegetation but pine trees and dry shrubs were to be found.

References: Begon, M., Oecol. (Berl) 23:31-47; Goldschmidt, E. 1956, J. Genn. 54:474-496; Goldschmidt, E. 1968, Proc. Tenth Intern. Cong. Ent. 2:821-828; Lakovaara, S., W. Hackman and K. Vespäläinen 1969, DIS 44:123; Shorrocks, B. 1975, J. Anim. Ecol. 44:851-863; Thornthwaite, C.W. 1948, Geogr. Rev. 38:55-94.

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Predictive value of heritability estimates.

In the heritability studies we find two important questions. The first is about the method giving us the best estimate. The second is for how long are the predictions on the changes that result from selective breeding accurate.

According to Falconer (1960) the response to selection is $R = h^2S$. In spite of the fact that this prediction is theoretically valid only for one generation, the data reported by Clayton et al. (1957), Sheldon (1963) and other authors suggest its validity for more than one generation. The purpose of this work is to check for how long the expected response according to this formula is in agreement with the observed facts and to study which method of estimating heritability is the best.

We have worked with a natural population (AR) at 19°C. The heritability of interocellar bristles was estimated in the base population before selection began by the methods of parent-offspring regression, half sib correlation and full sib correlation. The results were:

parent-offspring regression:	0.258 ± 0.030	(1)
half sib correlation:	0.354 ± 0.050	(2)
full sib correlation:	0.356 ± 0.050	(3)

This population has been submitted to mass selection with an intensity of selection of 20%. Four lines of selection were made: two high lines (A1H and A2H), and two low lines (A1L and A2L). Table 1 shows the response to selection from the first 10 generations and the expected responses according to the three methods mentioned.

Table 1

Line	Gen	ΣS	ΣR_{ob}	$R_e(1)$	$R_e(2)$	$R_e(3)$	Line	Gen	ΣS	ΣR_{ob}	$R_e(1)$	$R_e(2)$	$R_e(3)$
A1H	1	1.226	0.413	0.316	0.434	0.436	A1L	1	1.300	-0.006	0.335	0.460	0.463
	2	2.654	0.577	0.684	0.939	0.944		2	2.325	0.708	0.599	0.823	0.827
	3	3.958	0.708	1.021	1.401	1.409		3	3.508	0.876	0.905	1.241	1.249
	4	5.318	0.980	1.372	1.882	1.893		4	4.772	1.146	1.231	1.689	1.699
	5	7.485	-0.368	1.931	2.649	2.665		5	7.238	-0.040	1.087	2.562	2.576
	6	8.978	0.847	2.316	3.178	3.196		6	8.689	1.743	2.241	3.075	3.093
	7	10.451	1.668	2.696	3.699	3.720		7	10.342	1.906	2.668	3.661	3.681
	8	11.845	1.748	3.056	4.193	4.216		8	12.355	2.580	3.187	4.373	4.398
	9	13.371	1.948	3.449	4.733	4.760		9	14.455	3.626	3.729	5.117	5.146
	10	15.278	2.435	3.941	5.408	5.439		10	15.882	4.466	4.022	5.622	5.655
A2H	1	1.202	0.474	0.315	0.425	0.428	A2L	1	1.240	-0.180	0.319	0.439	0.441
	2	2.608	0.433	0.673	0.923	0.928		2	2.446	0.453	0.631	0.866	0.870
	3	3.922	0.693	1.011	1.388	1.396		3	3.560	0.519	0.918	1.260	1.267
	4	5.208	1.020	1.343	1.843	1.854		4	4.673	0.613	1.205	1.654	1.663
	5	6.955	1.326	1.794	2.462	2.476		5	5.473	0.760	1.468	1.942	1.948
	6	8.629	1.600	2.226	3.054	3.072		6	6.693	0.940	1.726	2.369	2.383
	7	10.982	2.586	2.833	3.887	3.909		7	7.720	1.033	1.991	2.733	2.748
	8	13.162	3.126	3.396	4.659	4.685		8	9.326	1.519	2.406	3.301	3.320
	9	16.665	4.080	4.297	5.896	5.929		9	11.414	2.339	2.945	4.040	4.063
	10	20.688	6.073	5.337	7.323	7.365		10	13.346	2.826	3.443	4.725	4.751

Table 2

Lines	Method (1)	(2)	(3)
A1H	7	4	4
A2H	10	4	4
A1L	10	6	6
A2L	4	2	2

From the two-way anova without replication, we obtain the results summarized in Table 2 that show during how many generations the expected response estimated by the three methods is in agreement with the observed values. It is clear that the parent-offspring regression gives us the best estimate.

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The ultrastructure of normal and "rotated" prepupal muscles of D. melanogaster.

The mutation abdomen rotatum (ar) of D. melanogaster was discovered and named by Beliajeff (1931). The effect of this gene on development was described by the writer and Howland (1942). It was then suggested that the symmetrical abnormalities of the mutant puparium as well as the sudden rotation of the imaginal abdomen at the end of the prepupal period were both due to abnormally strong contractions of the persisting larval muscles, which bring about the shortening of the puparium as well as the movements of the imago as it separates from the puparium.

It appears to be of interest to determine whether or not there might be an ultrastructural difference between the heterozygous normal prepupal muscles and the homozygous "rotated" muscles in individuals in the balanced lethal stock ar/ey^D.

Muscle fibers of normal prepupae and genetically "rotated" prepupae were dissected out in glutaraldehyde, routinely fixed and post-fixed in osmium tetroxide, embedded in epon, sectioned with a diamond knife, stained with uranyl acetate and lead citrate and examined with an Hitachi HU-11A EM. There appear to be consistent differences between the prepupal muscles of the normal and genetically "rotated" individuals. An account of these follows.

The ultrastructure of the normal prepupal muscles appears identical to the intersegmented abdominal muscle of the insect Rhodnius prolixus (Toselli and Pepe 1968). These are described as typical "slow-acting" muscles, lacking the "H" zone and the "M" line (Fig. 1).

The "rotated" prepupal muscles show a number of consistent differences from the normal muscles. First, there appears to be an exaggerated irregularity in the "Z" bands (Fig. 1, 2;Z). Second, the "I" bands show a markedly increased width, with the resultant decrease in the width of the "A" bands (Fig. 1,2,I,A). Third, the myofibrillae of the "rotated" muscles show a disorganization in the regions where they impinge upon the "I" bands (Fig. 2,D). It would seem that the combination of these three apparent muscle pathologies is the ultrastructural basis for the abnormally strong contractions which bring about the phenotypic abnormalities of the "rotated" puparium and imago.

References: Beliajeff, N.K. 1931, Biol. Zbl. 51:701-709; Marengo, N.P. and R.B. Howland 1942, Genetics 27:604-611; Toselli, P.H. and F.A. Pepe 1968, J. Cell Biol. 37:445-461.