Thompson, S.R. and J.E. Putnam. Ithaca College, Ithaca, New York. Alteration of the rudimentary wing phenotype with Minutes and temperature.

Besides female sterility, the syndrome of abnormalities associated with rudimentary mutants includes modification of the size and morphology of the wing. The effects of second and third chromosomal Minutes in combination with r^{39k} and various temperatures on wing development in r^{39k} was studied. Table 1 lists the Minute allele, the arbitrary rating of the Minute, and the effect of the Minute upon the rating of r^{39k} wings. Rudimentary wing phenotypes were arbitrarily rated on a scale of 3, a wing having an extreme defect was given a rating of 1, a moderate (intermediate) defect a rating of 2, and a normal wing a rating of 3. The Minutes were classified on a scale of 4, with 4 indicating extremely reduced bristle size and 0 indicating normal bristle size. In general, it seems that the stronger the Minute the more nearly normal the rudimentary wings appear. However, the Minutes appeared to have no modifying effect on the sterility associated with homozygous rudimentary females.

Table 1. Minute Interactions with r^{39k}.

Minute Allele	Mean Minute Rating	Mean r^{39k} Rating
Control (no Minute)	----	1.75
M(2)1^2	3.75	3.00
M(2)S7	3.25	1.80
M(2)S6	3.25	2.00
M(2)B	3.00	2.00
M(2)173	3.00	2.50
M(2)S5	2.75	2.50
M(2)S3	2.50	1.75
M(2)S4	2.25	1.75
M(2)S10	1.75	1.75
M(2)S11	1.00	1.80
M(2)S9	1.00	1.75
M(2)S8	0.50	1.75
M(3)w	4.00	3.00
M(3)B^2	3.50	2.00
M(3)1	3.00	1.75
M(3)S31	2.50	2.00
M(3)y	2.00	2.00
M(3)S34	1.75	2.50
M(3)36e	1.25	2.00
M(3)S36	1.00	1.75
M(3)B	0.00	1.75

Since Schultz (1929) demonstrated that Minutes delay the length of time required for normal development, rudimentary wing development was studied at different temperatures, which would alter the developmental rate. White prepupae were collected, placed in shell vials and allowed to undergo metamorphosis in constant temperature water baths at three different temperatures (18°, 23°, and 28° C.). Table 2 lists the effect of these temperatures on pupal development time and on wing size in r^{39k}.

Because the slower development, produced by the lower temperature (18° C), yielded wing sizes which were more normal than controls (23° C), and approximated those found with strong Minutes, it seems likely that the Minute effect was due to the slowing down of development. Because the two extreme temperatures, 18° and 23° C, have no overlap in mean wing size it was possible to use this difference to determine the

Table 2. Effect of temperature on r^{39k}.

Temperature °C.	Number of Flies	Mean Pupal Development Time in Hrs.	Mean Wing Rating
18	60	192.5	2.47
23	81	127	1.75
28	44	91.5	1.40

period in which the wing development was affected by the temperature (Temperature Effective Period). Prepupae were maintained at one temperature, 18° C, for a period of time and then later transferred to the second temperature. 28° C, to complete their development. The results of these transfers demonstrated that the temperature effective period lies somewhere between 15 and 20 hours in pupal development. Further experimentation would be necessary to more closely define this critical period.

Reference: Schultz, J. 1929. Genetics 14: 366-419.