

Bennett, J. and J.F. Hughes. Northern Illinois University, DeKalb, Illinois. Behavioral correlates of the w , w^+ gene substitution, observations without ether.

dish type observation chambers. In this study ether was dispensed with and smaller more convenient observation chambers were utilized (Figure 1).

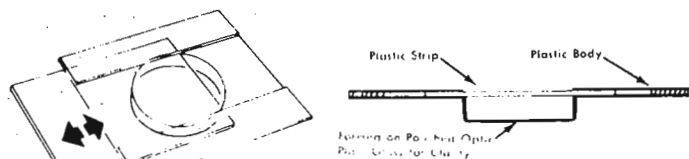


FIGURE 1

This procedure made anesthesia unnecessary and allowed direct observations without the ether trauma involved in the earlier study. A preliminary effort with Nitrogen anesthetization indicated that it, too, was traumatic in that many flies emerged with wings locked over their backs and did not recover for several hours. Thus complete avoidance of anesthesia seemed preferable.

Preliminary observations revealed a somewhat different set of characteristic behavioral patterns. Fourteen, many similar to the earlier study, were selected to record. One hundred flies of each sex and of each line were observed for 10 minutes each. An observed behavior pattern was recorded only once in each observation period. Flies were generally from two to four days of age and from stock cultures.

Of the observed traits five displayed significant differences in frequency between lines, or sexes, or both. Rubbing Forelegs: The fly stands on rear four legs and rubs front legs together rapidly. Rubbing Antenna: The fly used one front leg to brush antenna from base to tip many times in rapid succession. Rubbing Head and Eyes: The fly turns head and brushes top of head and eye and the neck region with one foreleg. Combs Wings: The fly stands on five legs, depresses tip of abdomen, combs top of wing with rear leg on the same side. Pulls Anus: The fly stands on front four legs uses rear pair of legs to pull anal region posteriorly.

The table indicates the observed numbers and the χ^2 probabilities for the differences, either between lines w^+ & w , or between sexes (across lines). In addition an activity value

Line & Sex	Rub Forelegs	Rub Antenna	Rub Head	Combs Wing	Pulls Anus
w^+ ♂	98	87	83	75	1
w^+ ♀	100	77	78	78	1
w ♂	92	77	80	72	1
w ♀	87	59	55	62	14
w vs w^+	<0.001	<0.004	<0.002	<0.04	<0.004
♂ vs ♀		<0.001	<0.002		

was obtained by summing all recorded activities. This score showed significant difference between the sexes but not between lines.

The wing combing behavior is closely similar to the earlier study. There does not seem to be any other parallelism with the behavior following etherization. In either case it appears that the substitution of the w gene for its normal allele does result in a number of measurable changes in behavioral tendencies. In several of the measures it appears to result in a lessening of the probability of the activity, and usually a more extreme reduction among males than females.

A pair of isogenic, inbred, Oregon-R lines, differing only at the white locus, were examined for behavioral differences. The lines were described more fully in DIS 45: 140-141. In the earlier study ether was used to separate the flies and place them in the small petri-dish type observation chambers. These chambers (#BGS4, 16mm dia. x 3mm deep, \$3.75/100, The Blister Co., 845 3rd Ave. East, Kalispell, Montana 59901) known as Blister™ slides, have sliding covers over a circular, flat bottomed cavity. It is possible to place a chamber at the end of a vial, shake the fly into the cavity and slide the cover in place before removing the vial. When turned over under a stereoscope the chamber is easily visible and fills the field at 10X magnification.