

LABORATORY 4, EXERCISE 1. CHROMOSOME LOCATION

Purpose

The purpose of this Laboratory is to introduce you to the important genetic concept of Linkage. You will observe first-hand the impacts of Linkage on the results of standard Dihybrid Crosses. By the end of this lab you should have acquired a better understanding of Linkage. You will be able to apply this knowledge to determine the Physical Location of Genes responsible for fruit fly Phenotypes. Your TA will lead you through this first Exercise to introduce you to important aspects of 2-point Linkage analysis.

Exercise Protocol

1. Launch the Fly Lab Colony (<https://cws.auburn.edu/FlyLab>) and open a LINKAGE cross.

2. Select the MALE parental fly and the following mutant traits:

Body Color: BLACK

Eye Color: PURPLE

3. Select the number of offspring you wish to produce and MATE the parental flies.

4. Select the F1 MALE offspring (move your cursor over the fly and make sure it is highlighted in blue).

5. Select the same number of offspring you chose above. The corresponding PARENTAL fly (FEMALE in this case) is automatically selected to mate with the F1 offspring in a BACK CROSS.

6. Cross the flies to produce an F2 Generation and record all the data below.

7. Repeat the original PARENTAL cross again (Steps 2 and 3 above).

8. This time, select the F1 FEMALE offspring (highlight in blue by clicking with your cursor). The corresponding parental fly will again be automatically chosen (MALE in this case) and back crossed to the F1 female when you the cross is performed.

9. Cross the flies to produce the F2 Generation and record all the data below.

10. Answer the questions at the end of this Exercise.

LAB 4 EXERCISE 1 - DATA SHEET

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TRAIT 2: Eye Color: **PURPLE (P)**

X

Genotype

Genotype

[illegible]

x

Genotype

Genotype

[illegible]

Chi-Squared Test Cross 1

Phenotype	Observed	Expected	O - E	(O - E) ²	(O - E) ² / E
TOTAL					

Observed Chi – Squared Value

=

Degrees of Freedom (*df*)

=

Table Value (0.05)

=

Overall Conclusion

=

Chi-Squared Test Cross 2

Phenotype	Observed	Expected	O - E	(O - E) ²	(O - E) ² / E
TOTAL					

Observed Chi – Squared Value

=

Degrees of Freedom (*df*)

=

Table Value (0.05)

=

Overall Conclusion

=

Describe any differences in the outcomes from the two sets of matings.

Propose a hypothesis to explain any differences that you observed in your results.