COURSE: BIOL3001 GENETICS LAB

LABORATORY EXERCISE 2. POPULATION EFFECTS

Exercise Protocol

Part 2

You may use the same trait as in Part 1 or you may choose a different one to examine the effect of offspring population size on observed phenotypic ratios. However, use the same trait for all progeny numbers.

STEPS FOR THIS EXERCISE

1. Return to the **FLY COLONY** program on Canvas.

2. Select your mutant phenotype in one of the drop down boxes on the Parental screen.

3. Mate the flies through the F2 generation using FOUR DIFFERENT OFFSPRING numbers:
   a. 5000 offspring
   b. 500
   c. 50
   d. 10

4. Record the results from each set of matings on the DATA SHEETS provided.

5. Answer the Exercise 2 Questions below.

   Predict what the Expected ration of each cross will yield and enter in the boxes below. Then look at your total progeny numbers from the cross. Divide the number of dominant offspring by the number of recessive offspring. This is your Observed phenotypic ratio (round to the nearest decimal). Enter your observed ratio for each population below.

Expected Ratio		Observed Ratio
	5000	
	500	
	50	
	10	

Describe what you see happening to the Observed numbers versus the Expected ratios. Reflect on WHY you may be seeing something occurring.

GENETIC CROSS

DATA SHEET (Exercise 2) – **5000 Offspring**

NAME:

TRAIT: **PHENOTYPES CROSSED:** **Male** X **Female**

CROSS DIAGRAM

Parentals	**Male**		**Female**
Phenotype		**x**	
Genotype		**x**	

F1 Results	**Male**	**Female**
Phenotype		
Genotype		

Parents for F2	**Male**		**Female**
Phenotype		**x**	
Genotype		**x**	

F2 Results ***Predicted Segregation Ratio*** **=** **phenotype** **ratio** **:** **phenotype** **ratio**

Gender	**Phenotype**	**Genotype**	**Exp Number**	**Obs Number**

Chi-Squared Test (enter values from F2 Generation Page, combine sexes to one phenotype)

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 = --

CONCLUSIONS:

GENETIC CROSS

DATA SHEET (Exercise 2) – **500 Offspring**

NAME:

TRAIT: **PHENOTYPES CROSSED:** **Male** X **Female**

CROSS DIAGRAM

Parentals	**Male**		**Female**
Phenotype		**x**	
Genotype		**x**	

F1 Results	**Male**	**Female**
Phenotype		
Genotype		

Parents for F2	**Male**		**Female**
Phenotype		**x**	
Genotype		**x**	

F2 Results ***Predicted Segregation Ratio*** **=** **phenotype** **ratio** **:** **phenotype** **ratio**

Gender	**Phenotype**	**Genotype**	**Exp Number**	**Obs Number**

Chi-Squared Test (enter values from F2 Generation Page, combine sexes to one phenotype)

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 = --

CONCLUSIONS:

GENETIC CROSS

DATA SHEET (Exercise 2) – **50 Offspring**

NAME:

TRAIT: **PHENOTYPES CROSSED:** **Male** X **Female**

CROSS DIAGRAM

Parentals	**Male**		**Female**
Phenotype		**x**	
Genotype		**x**	

F1 Results	**Male**	**Female**
Phenotype		
Genotype		

Parents for F2	**Male**		**Female**
Phenotype		**x**	
Genotype		**x**	

F2 Results ***Predicted Segregation Ratio*** **=** **phenotype** **ratio** **:** **phenotype** **ratio**

Gender	**Phenotype**	**Genotype**	**Exp Number**	**Obs Number**

Chi-Squared Test (enter values from F2 Generation Page, combine sexes to one phenotype)

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 **=** --

CONCLUSIONS:

GENETIC CROSS

DATA SHEET (Exercise 2) – **10 Offspring**

NAME:

TRAIT: **PHENOTYPES CROSSED:** **Male** X **Female**

CROSS DIAGRAM

Parentals	**Male**		**Female**
Phenotype		**x**	
Genotype		**x**	

F1 Results	**Male**	**Female**
Phenotype		
Genotype		

Parents for F2	**Male**		**Female**
Phenotype		**x**	
Genotype		**x**	

F2 Results ***Predicted Segregation Ratio*** **=** **phenotype** **ratio** **:** **phenotype** **ratio**

Gender	**Phenotype**	**Genotype**	**Exp Number**	**Obs Number**

Chi-Squared Test (enter values from F2 Generation Page, combine sexes to one phenotype)

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 **=** --

CONCLUSIONS: