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BIO 2459-Thursday class

Date: 21/3/2019

Lab Report 4-7: Drosophila Genetics

**Abstract:**

In our third lab experiment we will learn more about patterns of inheritance, by performing monohybrid and dihybrid crosses. In particular we will be crossing two types of Drosophila melanogaster, a wild-type and mutant parental strains. By the end of the experiment we will be able to examine inheritance.

**Introduction:**

Drosophila melanogaster is a living model organism that is used to study patterns of inheritance. The small size, short life cycle and ease of cultivation made it possible to use a number of Drosophila species as model organism for genetic research. Drosophila melanogaster is a universal tool of biogenetics, and billions of flies continue to demonstrate to the scientists the laws of heredity. Drosophila melanogaster is one of the most studied species of living organisms. A monohybrid cross is a breeding of two homozygous organisms (P generation) that differ from one another in one trait (Dominant- two capital letters (PP), Recessive- two lower case letters (pp)). In fact, the offspring of the F1 will all be heterozygous. As a matter of fact, the offspring of the next generation(F2) will all have (PP, Pp, pp). Since the eye color is sex-linked, the expected phenotypic ratio should be 3:1(Bierema, 40).

**Methods and Results:**

During the first week of experiment, our group was able to cross a parent (P) generation of Drosophila melanogaster. The parent generation consist of 3 Wild type males and three White type females. The next step was to place our P generation in to the media and let them mate for a week. The following week we were able to remove our F1 generation from the media and score them. All data was recorded.

Phenotypes of P generation: red eyes, white eyes, long wings

F1 generation: red eyes (♀-- wild type) x white eyes (♂-- mutant)

|  |  |  |
| --- | --- | --- |
|  | **P** | **P** |
| **p** | Pp | Pp |
| **p** | Pp | Pp |

|  |  |  |
| --- | --- | --- |
|  | **P** | **p** |
| **P** | PP | Pp |
| **p** | Pp | pp |

P generation (Punnet Square) F2 generation (Punnet Square)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Phenotypes | **Observed** | **Expected** | **(O-E)** | **(O-E)^2** | **(O-E)^2/E** | **Null Hypothesis** | ᵡ2 = 0.075 |
| **Wild type(red)** | 4 | 3.75 | 0.25 | 0.06 | 0.015 | Accepted |
| **Mutant(white)** | 1 | 1.25 | 0.25 | 0.06 | 0.06 |
| **Total** | 5 | 5 |

Predicted phenotype 3:1 ratio for red eyes

**Discussion:**

Since P>0.05, a null Hypothesis was accepted. As expected, our F2 generation had 3:1 phenotypic ratio. In fact, our F2 generation didn’t have any females with white eyes, which suggests that eye color is sex-linked trait.

**Reference:**

Bierema, Andrea, and Schwartz, Renee. "Learning from the Fruit Fly." *Science Teacher* 83.8 (2016): 39-47. Web.