Stephanie Cabrera **Lab Report 2:** Meiosis and Genetic Recombination

Abstract:

The purpose of this experiment was to analyze cell division through meiosis using cultivated crosses of fungi, *Sordaria fimicola*. A wild type and mutant strain culture of this fungi were used to analyze the function of meiosis/recombination. After cultivating these crosses for one week they were analyzed to determine if crossing over occurred during prophase I of meiosis. Recombination/crossing over of these strains were demonstrated through 2:2:2 or a 2:4:2 color pattern. 30 map units were reported for the wild type and gray variant and 25 map units for wild type and tan. This experiment shows how meiosis can develop offspring from different parents through the process of crossing over and recombination.

Introduction:

This experiment demonstrates the function of meiosis and recombination using *Sordaria fimicola* strains. Meiosis is the cell division of an original diploid cell resulting in 4 haploid cells. These haploid cells are found in sperm and egg cells (gametes) thus producing a zygote when fused together. The 4 haploid cells produced by meiosis are genetically different unlike in mitosis where the daughters cells produced are identical. Cell division in meiosis is a product of two separate divisions; Meiosis I and Meiosis II. In meiosis I the homologous chromosomes separate as for in meiosis II the sister chromatids separate (Blair, 2018). Unlike mitosis, meiosis can also lead to crossing over in meiosis I thus causing these cells to be genetically different. In this experiment the fungi *Sordaria fimicola* are used, a wild-type strain and two mutant variants (tan and gray). Two crosses are prepared to demonstrate cross over between the strains. If no recombination occurred between the strains, then a 4:4 pattern will be observed from the asci. If crossing over did occur, then 2:2:2:2 or 2:4:2 pattern will be reported.

Methods:

In order to conduct this experiment three different strains of *Sordaria fimicola* were obtained. In week 1, two crosses where made; wild-type vs. mutant tan and wild-type vs. mutant gray. These crosses were made by drawing four equal quadrants on the bottom of the petri dish; 2 quadrants obtained wild type and the other 2 quadrants tan or gray. This was then cultivated for 1 week. In week 2 a piece of the perithecia near the crossover site was removed and placed on a glass slide. The perithecia were ruptured to release the asci. This was then observed underneath a microscope to observe any crossing over/ recombination.

Results: Strain Crosses

This table shows the different asci present in both crosses.

Strains Crossed	#Non-recombinant asci	# recombinant asci	Total asci	% Recombinant	Map Units (% Recombinant /2)
Wild- type x gray	10	15	25	60	30
Wild- type X tan	12	12	24	50	25

Discussion/Conclusion:

In conclusion this lab this lab demonstrated the function of meiosis through *Sordaria fimicola* crosses. For this lab anayalsis due to complications presented in not being able to differentiate between the mutants tan and gray the crosses provided by Professor Gotesman were used. Crossing over was reported between the different strains. 10 (4:4) and 15 (2:2:2/2:4:2) wild-type vs gray were reported. 12 (4:4) and 12 (2:2:2/2:4:2) wild type vs. tan were observed. Different color strains were used in order to determine if the recombination occurred by same gene or different gene. This experiment provides an understanding of crossing over in meiosis I as well as recombination in genetics.

References:

Blair, Christopher, (2018). Bio 2450L Genetics Laboratory Manual., pg.25-32