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BIO 2450L
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Lab Report 2: *Sordaria*

Abstract:
The purpose of this lab was to determine whether the specimen, *Sordaria fimicola*, showed signs of crossing over by comparing the average recombinant frequency and the distance unit between the gene to the centromere. Two mutant strains, gray and tan, were crossed over with a wildtype strain. As a result, the map units of this crossover are the same. The gene for spore coat color and the centromere are controlled by the same since both tan and grey crossover resulted in the same map units.

Introduction:
Sordaria fimicola is a type of ascomycete fungus that is found in dung of herbivorous animals. This type of fungus produces eight haploid ascospores in sac called an ascus within perithecium. Crossing over occurs when the genes are exchanged between the maternal and paternal chromosomes. This crossing over results in a recombinant gene. The process of crossing over produces an exchange of genetic information between homologous chromosomes for spore color and the centromere.

Methods:
Students in pairs were asked to examine the cross plates that were prepared and cultivated between the wild-type and tan vs. wild-type and gray from the previous week. A sterilized toothpick was used to remove a few perithecia from the cross plate and create a wet mount on to a glass slide. A drop of water was then added on to the specimen, and then covered by a glass slip. A microscope at the lowest magnification was set to observe the specimen. The crossing over of this organism was observed by counting the order of ascospores in crosses between mutant and wild-type strains. Wild-type spores were identified as dark colored, while the two mutant strains would be either tan or gray. To have a closer look at the ascopores, the magnification was switched to a higher power. The count of asci and its color pattern were examined and recorded.

Results:
The total number of asci that was present in both the wild-type x gray, and wild-type x tan slides, were 28. This is obtained by adding 14 non-recombinant asci and 14 recombinant asci. The percentage of recombinant asci or the average asci crossing over frequency was 50%. The distance between the gene to centromere resulted in 25 map units.

Strains Crossed	# Non-recombinant asci	# Recombinant asci	Total asci	% Recombinant	Map Units (% Recombinant/2)
Wild-type x gray	14	14	28	50%	25
Wild-type x tan	14	14	28	50%	25

Discussion:
The distance from the centromere to the gene of the wildtype x gray is equal to the distance of wildtype x tan. The non-recombinant asci for both crossovers resulted in a color pattern of a 4:4 ratio, whereas recombinant asci resulted in a color pattern of a 2:2:2:2 ratio. According to Brooker, equal map units distance indicates that crossing over has occurred and the same gene controls for both the spore color and the centromere (2016).

References
Brooker, R. J. (2016). *Concepts of genetics*. New York, NY: McGraw Hill Education.