Lab 3 Mitosis and Meiosis

Experiment 4: Crossing Over

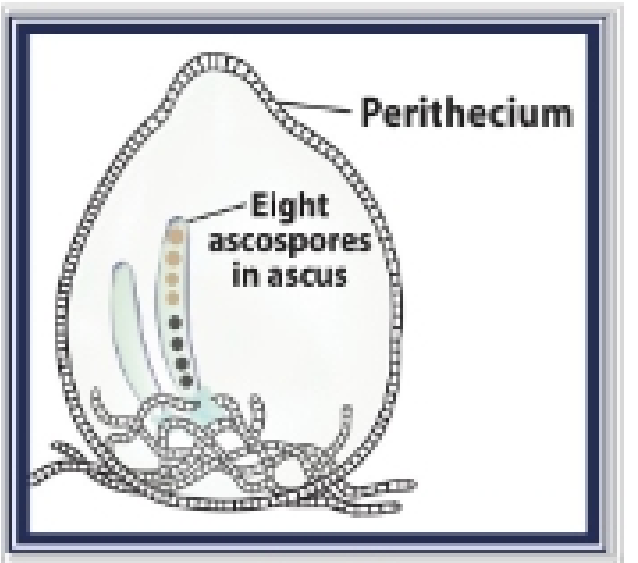


Figure 6

In this lab, pictures of a prepared slide of the fungus *Sordaria fimicola* will be used to examine the effects of crossing over. The life cycle of this fungus begins in the haploid state. However, after the combination of two different types of strains, they develop a diploid nucleus. As the life cycle continues, the diploid nucleus undergoes meiosis, along with mitosis, and produces eight haploid ascospores which are stored in a sac called an ascus (Figure 6). Once maturation has been reached, the sac will burst, allowing the ascospores to be released. These spores are haploid and thus begin the life cycle again.

Sordaria fimicola is often used to observe crossing over because the wild type strain has black ascospores and the mutant type has tan ascospores. When the two strains go through meiosis, the location of the ascospores will directly show if crossing over has occurred.

If crossover *does not* occur, the ascospores will be arranged like Figure 7.

If crossover *does* occur, the ascospores will be arranged like Figure 8.

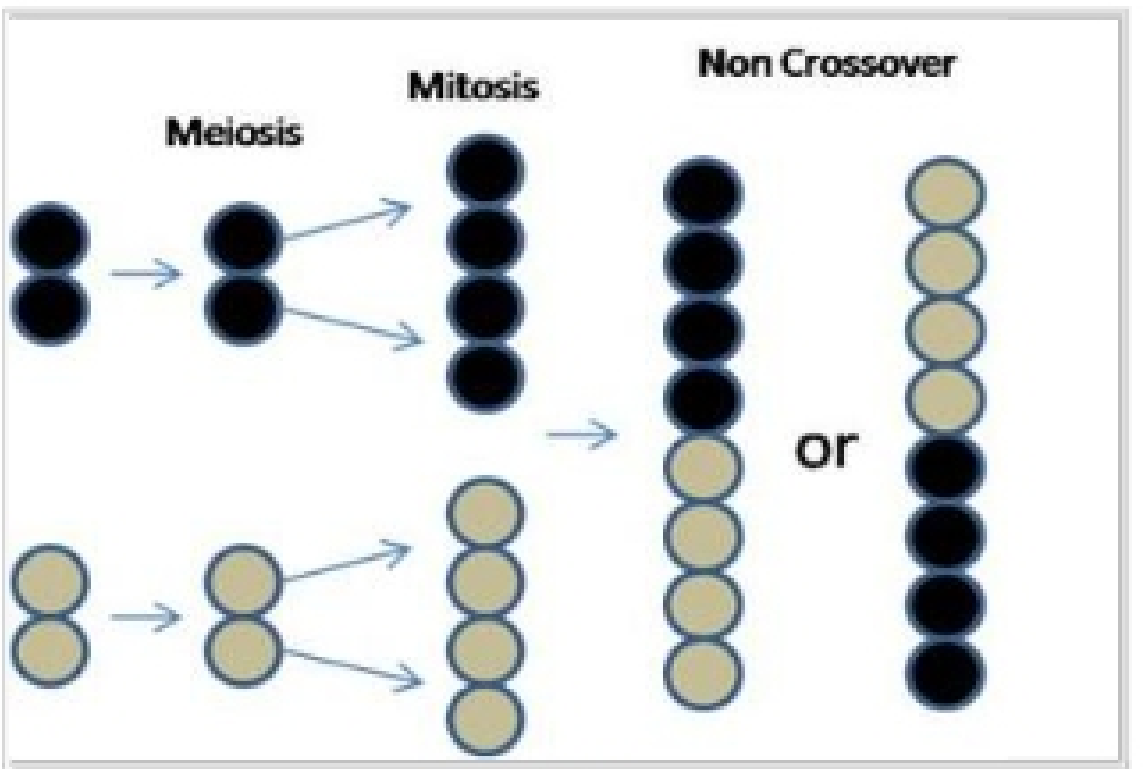


Figure 7

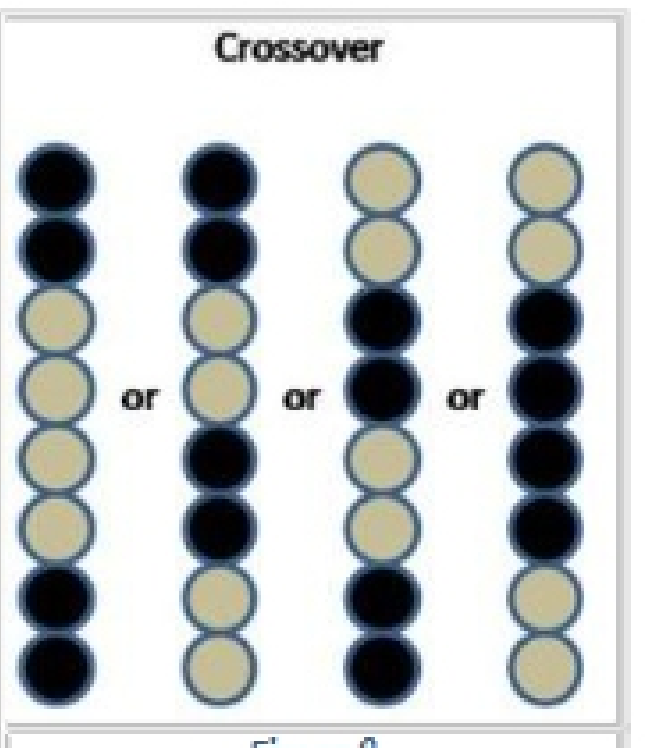


Figure 8

The measurement to describe the difference between genes is referred to as map unit. As the distance increases between genes, the likelihood of crossing over becomes greater, therefore demonstrating that the proportion of crossovers corresponds with the

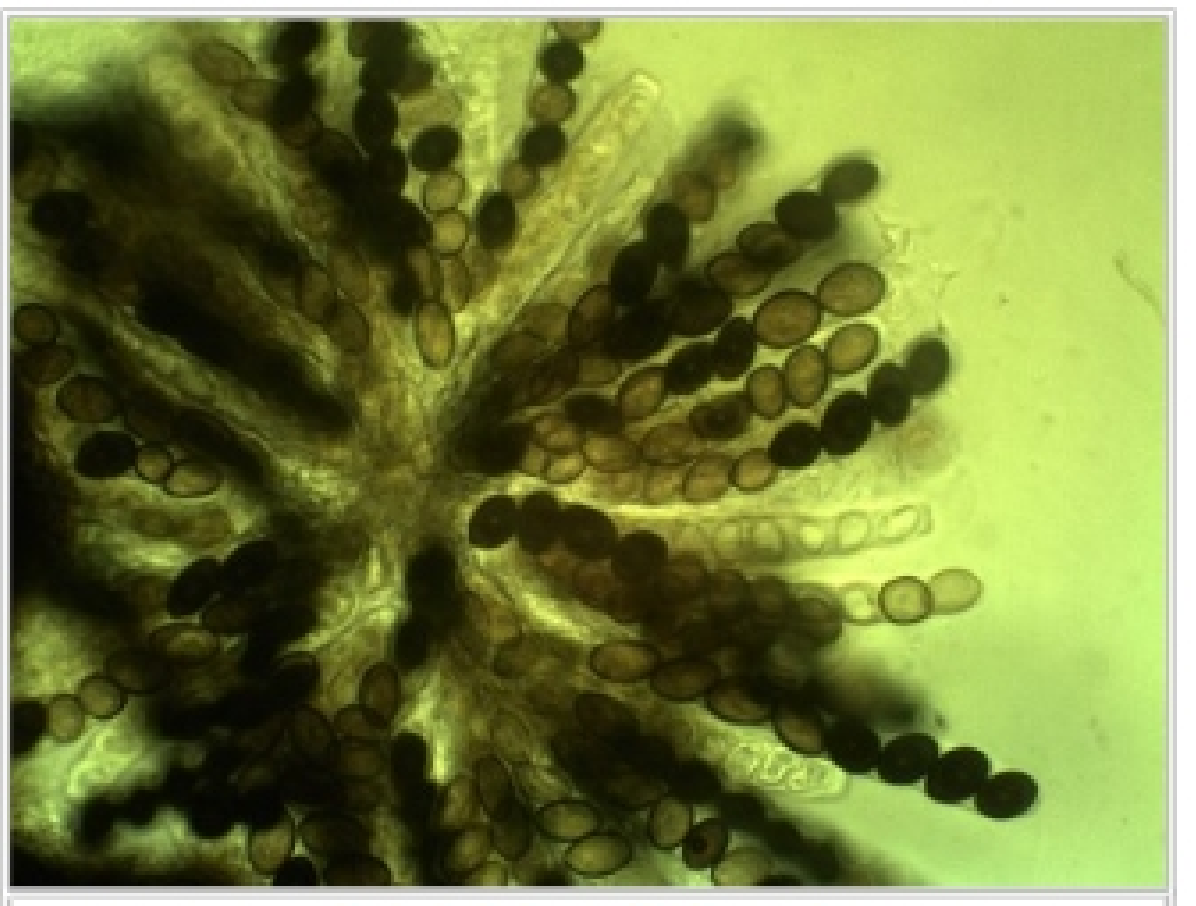
distance between genes. As a rule, the percentage of recombinations is equal to the number of map units between two genes or a gene and the centromere.

Materials

Sordaria fimicola Digital Slide Images

Procedure

1. Examine the three fields of view of the *Sordaria fimicola*.
2. There are at least 10 different hybrids (crossovers) in the following images. Count the total number of clearly visible crossovers, as well as the number of clearly visible non-crossovers. Record your data for each image in Table 4.



Sordaria fimicola 400X (Image 1)

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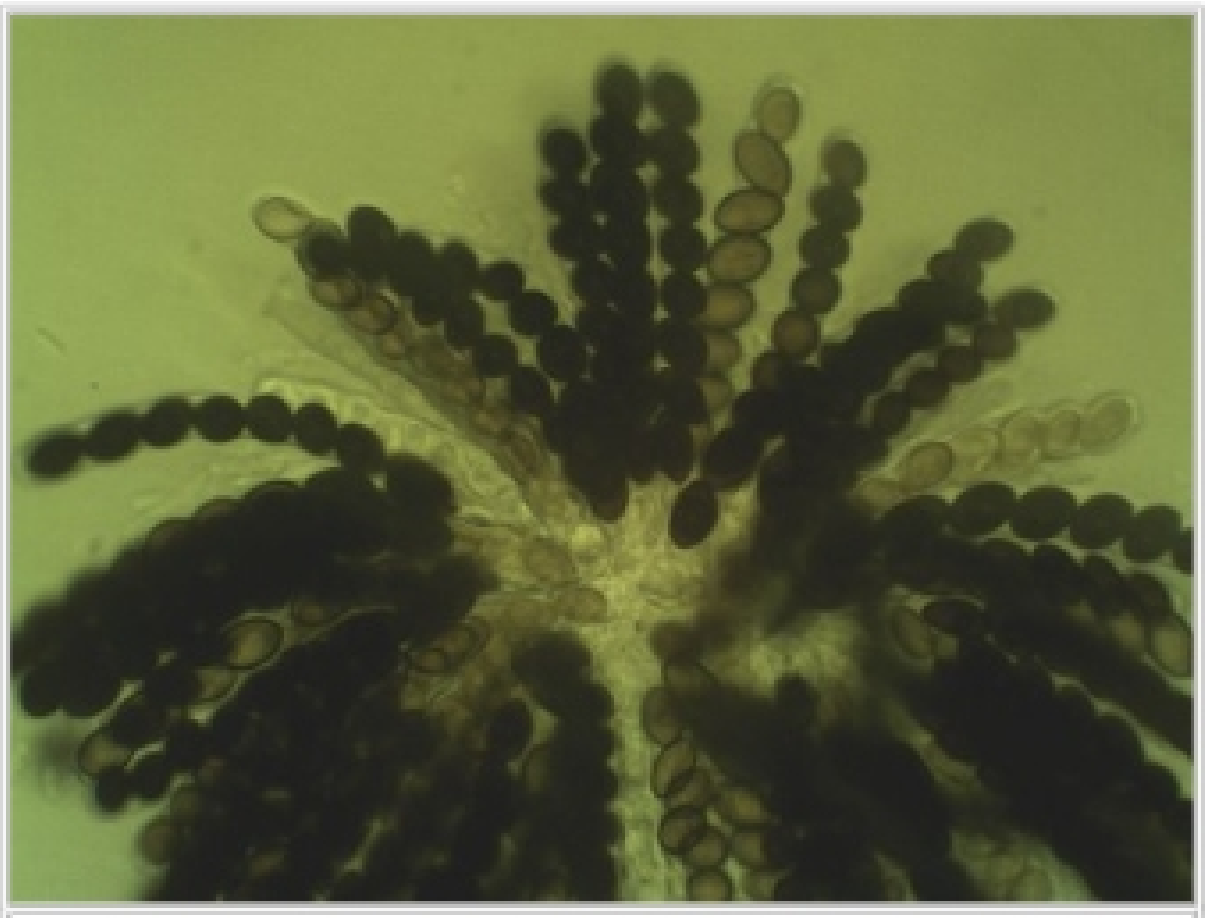

Sordaria fimicola 400X (Image 2)

Sordaria fimicola 400X (Image 3)