PLSC 611: Genomics

Due: October 4, 2019  
Points: 20% of the class grade

Cereal Genome Comparison

Comparative genomics provides a deeper understanding of the mechanisms responsible for the current genomic structure of a species. For this to be effective, it is preferable to have the genome sequence of multiple species within a taxonomic lineage. To date in plants, the grass lineage is the best characterized at the sequence level. The purpose of this paper is for you to develop an appreciation for similarities and differences that exist among different grass species. This would include gene content, gene families, lineage specific genes, and retrotransposons.

You are to read the primary sequencing papers for rice, sorghum, maize, and Brachypodium. First, your essay should compare and contrast the methods in which the genomes were sequenced and assembled, and how specific gene models were defined. Next you are to describe the gene content that is shared between species, or unique within a species. Next, you are to consider the retrotransposon distribution within each species, and comment on evolution and expansion of these elements. Finally, you are to consider the synteny relationships among the species by describing that relationship in detail. You will also need to discuss other recent research that supports the evolution model of grass chromosomes and genomes.

The URLs for the primary papers you will need are listed on the class WWW site and cited below. You should also read the supplementary data. It will provide valuable information that will support your discussion. Finally, you must include at least three other references that you used when preparing your paper.

Format

Cover page: Title and author listed on cover page  
Margins: 1 inch margins, top, bottom, left, and right  
Length of narrative: 8-10 pages  
Spacing: Single line spacing within a paragraph; double spacing between paragraphs  
Font: 12 pt Times Roman or 11 pt Arial/Helvicitca  
Reference: Separate reference page

Source Papers

1. Rice  
   http://www.nature.com/nature/journal/v436/n7052/full/nature03895.html
2. Sorghum  
   http://www.nature.com/nature/journal/v457/n7229/full/nature07723.html
3. Maize  
   http://www.sciencemag.org/cgi/content/full/326/5956/1112?ijkey=1b31839217abce6e1fd6e1cf9ada4adc717992f6
4. Brachypodium  
   http://www.nature.com/nature/journal/v463/n7282/full/nature08747.html