

North Dakota State University
PLSC 731: Plant Molecular Genetics
Spring 2020

On-Line Learning Study Guide
Plant Genome Evolution

The following is your on-line study guide for the topic of “**Plant Genome Evolution**”. You have access to the following resources at this WWW site:

- **Highlighted .pdf Notes** (used in the on-line lecture)
- **On-Line Lecture**
- **Manuscripts (2)**

Learning Objectives

1. Understand the **evolutionary relationship** of the principle groups of Viridiplantae.
2. Understand the **shared and unique duplications events** in the crop species with which you wrote you review article
3. Explain how **phylogenetic considerations** can be useful in cloning genes controlling a specific phenotype
4. Explain the **techniques** used to identify candidate genes between related species

Activities

1. View the **On-Line Lecture** which is ~1.25 hrs long (if you view it without stops). I would suggest that you first print out the **Highlighted .pdf Notes** and go over them before watching the lecture. This way, in general, you will be familiar with the material that will be covered in the lecture.
2. View the following lecture once (or preferably several times) about the genome duplication history of plants
 - <https://www.youtube.com/watch?v=GOds9jMqfao>
3. Read the two papers regarding plant duplications and comparative gene cloning
4. **Reflections on the Manuscripts**

During (and after) reading the manuscripts, develop and consider the following:

- Create a table that 1) lists each major subdivisions of the Viridiplantae, and 2) the type of major evolutionary adaptations associated with each subdivisions of the Viridiplantae
- Compare the deep duplication history of algae and green plants
- What gene families date to the beginning of the Viridiplantae and which appeared since the appearance of the Viridiplantate?
- How was the syntentic relationship between common bean and soybean used in the cloning of the common bean photoperiod gene?
- What is the relationship between soybean and common bean with regards to the putative structure and function of the *FT* genes?

Be prepared to be assessed with respect to your understanding of the learning objectives by *Thursday, April 9, 2020.*