PLSC 731 - Plant Molecular Genetics
Final Exam – 2010

Points: 100 pts
Due: May 12, 2010; 12:00 pm

All answers should use the standard format you have used for class papers and Exam 1.

1. Seed size is a major component of yield, and many studies have focused on the genetic and molecular mechanisms that control this important agricultural trait. This trait has been extensively studied in rice. Read the review article by Xing and Zhang (2010, Annu Rev of Pl Biol, in press), and write a summary review focusing on the genetic and molecular genetics of this this important trait. In addition, critically read the article by Takano-Kai et al. (2008, Genetics 182:1323) and include a brief summary of the cloning and genetic characterization of this gene. You can also include other research articles if you feel it will improve your essay answer. (30 points; maximum 2 pages)

2. Flowering time is a major factor for crop productivity in plants, and many studies using different populations have evaluated the genetic control of this trait. Recently, Ehrenreich et al (2009, Genetics 183:325) used an association mapping approach to evaluate this trait in Arabidopsis. Read this article (and others that you feel might be relevant) and write a detailed summary of their research and what was learned about the genetics and molecular genetics of flowering time. (30 points; maximum 2 pages)

3. Plant genetics and molecular genetics are changing at a rapid pace. New marker technologies and new genetic mapping approaches are significantly changing how scientists approach the problem of understanding the genetic control of important traits. These new tools and discoveries are also changing how selection is practiced for plant improvement. Write an integrative essay that compares and contrasts historical and recently emerging plant molecular genetic techniques and tools. Also describe how these have been used to understand the genetic factors controlling important agricultural traits. Also describe how the new and emerging techniques may be used in applied plant genetics. You can reference any source you feel is appropriate, although references are not necessary. (40 points; maximum 2.5 pages)