

PLB154 (Winter 2006)

Introduction to Plant Breeding

Information from class notes, textbook and readings

Second part (Jan. 31 - March 09)

Gene action: describe the different types of gene action reviewed in the lectures; for one of these (your choice), illustrate the effect of allele substitution.

Genetic and phenotypic variance

Heritability:

a) definitions

b) describe and compare the different methods of calculation of heritability

Describe the basic approach of QTL mapping. What is the major difference between QTL and association mapping?

Distinguish between target and selection populations.

What are the different types of cultivars in predominantly self-pollinated crops? Give examples of 5 crops for each.

F. Bliss proposed 5 primary activities in a breeding program. Discuss/provide examples for each of these activities.

How do you determine the best sources of new genetic variability? Discuss.

Distinguish between recombination, selection, and criterion units.

List and discuss different ways how to obtain high T populations.

What is the basic equation for gains from selection? Discuss the different factors involved.

Discuss some considerations associated with selection. Intensity, one or multiple traits, concurrent vs. tandem or sequential selection, correlated traits.

What are the “best” sources of genetic diversity?

Is plant breeding just a numbers game, i.e., the goals can be achieved by just increasing numbers of progeny or can these goals be achieved by reducing number of progeny?

Define the following: a) phenotypic and genotypic selection; and b) selection unit.

Describe three breeding population breeding methods of your choice in increasing order of male parent control.

Describe the cytoplasmic-genic male sterility system and its role in hybrid seed production.

How could a nuclear genic male sterility gene be used in breeding? Would a dominant or a recessive gene be more advantageous?

What are some of the differences in a breeding program focused on an area the size of the Central Valley and a breeding program at an International Center like CIAT, IRRI, or CIMMYT?

Describe the different roles of molecular markers in crop breeding.