SYLLABUS
INTRODUCTION TO PLANT QUANTITATIVE GENETICS

INSTRUCTORS:

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References

B = Bernardo, Breeding for Quantitative Traits in Plants, 2nd ed.

LW = Lynch & Walsh: Genetics and Analysis of Quantitative Traits (book)

WL = Walsh & Lynch: Evolution and Selection of Quantitative Traits (website)
http://nitro.biosci.arizona.edu/zbook/NewVolume_2/newvol2.html

LECTURE SCHEDULE

Monday, 7 Jan

8:30 10:00 am 1. Introd to Modern Plant Breeding (Gore, Gutierrez, Walsh)
Background reading: B Chapter 1

10:00 10:30 am Break

10:30 12:00 am 2. Basic Genetics (Walsh, Gore)
Background reading: LW Chapter 4

12:00 1:30 pm Lunch

1:30 3:00 pm 3. Basic Statistics (Walsh)
Background reading: LW Chapters 2, 3
Additional reading: LW Appendix A4

3:00 3:30 pm Break

3:30 5:00 pm 4. Allelic Effects and Genetic Variances (Walsh)
Background reading: B Chapters 3, 6
Additional reading: LW Chapters 4, 5

Tuesday, 8 Jan

8:30 10:00 am 5. Resemblance Between Relatives (Walsh)
Background reading: B Chapter 6
Additional reading: LW Chapter 7

10:00 10:30 am Break

10:30 12:00 am 6. Heritability and Field Designs (Gutierrez)
Background reading: B Chapters 6, 7
Additional reading: LW Chapters 17, 18, 20, 22
Holland, J., W.E. Nyquist, C.T. Cervantes-Martinez. 2010. Estimating and Interpreting Heritability for Plant Breeding: An Update. Plant Breeding Reviews 22: 9-112.

12:00 1:30 pm Lunch

1:30 3:00 pm 7. QTL Mapping (Gutierrez)
Background reading: B Chapter 5
Additional reading: LW Chapters 12-15

3:00 3:30 pm Break

3:30 5:00 pm 8. Association Mapping (Walsh, Gore)
Background reading: B Chapter 5.4
Additional reading: LW Chapter 16

Wednesday, 9 Jan

8:30 10:00 am 9. Inbreeding, Heterosis (Walsh, Gore)
Background reading: B Chapter 12
Additional reading: LW Chapter 10,

10:00 10:30 am Break

10:30 12:00 am 10. Mass and Family Selection (Walsh)
Background reading: B Chapters 9, 10
Additional reading: WL Chapters 12, 13, 19, 20, 35

ADDITIONAL BOOKS ON QUANTITATIVE GENETICS

General

Falconer, D. S. and T. F. C. Mackay. *Introduction to Quantitative Genetics*, 4th Edition

Lynch, M. and B. Walsh. 1998. *Genetics and Analysis of Quantitative Traits*. Sinauer.

Mather, K., and J. L. Jinks. 1982. *Biometrical Genetics*. (3rd Ed.) Chapman & Hall.

Plant Breeding

Wricke, G., and W. E. Weber. 1986. *Quantitative Genetics and Selection in Plant Breeding.* De Gruyter.

Mayo, O. 1987. *The Theory of Plant Breeding*. Oxford.

Stoskopf, N. C.. D. T. Tomes, and B. R. Christie. 1993. *Plant breeding: Theory and practice.* Westview, Boulder.

Sleper, D. A., and J. M. Poehlman. 2006. *Breeding Field Crops*. 5th Edition. Blackwell

Bernardo, R. 2010. *Breeding for Quantitative Traits in Plants,* 2nd Ed Stemma Press.

Hallauer, A. R., M. J. Carena, and J. B. Miranda Filho. 2010. *Quantitative Genetics in Maize Breeding*. Iowa State Press.

Statistical and Technical Issues

Bulmer, M. 1980. *The Mathematical Theory of Quantitative Genetics*. Clarendon Press.

Kempthorne, O. 1969. *An Introduction to Genetic Statistics*. Iowa State University Press.

Sorensen, D., and D. Gianola. 2002. *Likelihood, Bayesian, and MCMC Methods in Quantitative Genetics*. Springer.

Saxton, A. M. (Ed). 2004. *Genetic Analysis of Complex Traits Using SAS*. SAS Press.

Wu, R., C.-X. Ma, and G. Casella. 2007. *Statistical Genetics of Quantitative Traits: Linkage, Maps. and QTL*. Springer, N.Y

References cited in the Gore modules are also listed at the end of the notes