**Ploidy: Study guide and reading assignments**

***Required readings:***

Udall and Wendel. 2006. The Plant Genome. 46:S1

1. Abstract and all sections from page S1 – S6, until the section on “The role of polyploidy in crop improvement”.
2. You are encouraged to read the rest of this fascinating paper.
3. What advantages are there to a plant to be polyploid? Are there any drawbacks?
4. Does the x number of a polyploid indicate how “fit” it will be? In other words, are hexaploids more fit (for example higher yielding) than tetraploids, etc.?
5. What are aneuploids and why would they be more amenable to study in polyploids than in diploids?
6. Is the statement “only two alleles are possible at a locus but many alleles are possible in a population” still correct when it comes to polyploids? Why or why not?
7. Be able to give examples of important polyploid crops and know if they are auto or allopolyploids.
8. Differentiate between how autopolyploids and allopolyploids arise in nature.
9. Explain how you would create a hexaploid triticale, an octaploid triticale.
10. Differentiate between homologous and homoeologous chromosomes.
11. What is the triangle of U?
12. What is the Ph1 locus in wheat? If you could override its effects how might this help to introduce new genetic variation into wheat?
13. Why is bivalent pairing the key to fertility in polyploids?
14. Why are cultivated bananas sterile and what implications does this have for genetic diversity in this important food crop?
15. Explain how triploid watermelons are bred and produced.
16. Why are haploid plants able to grow but still be sterile?
17. Why do breeders of self-pollinated (e.g. barley) and cross-pollinated (e.g. maize) crops both use doubled haploids?
18. Why are androgenetic systems for doubled haploid production more efficient than gynogenetic systems, at least in theory?