**Asexual reproduction and plants that cover the reproductive bases: Study guide and reading assignments**

# Required readings:

# Hand and Koltunow. 2014. Genetics. 197:441-450

# You are responsible for reading the abstract, the material starting at the beginning of the paper and ending at “Genetics and Inheritance of Apomixis”, and the Conclusions.

# If you have the opportunity, enjoy reading the full article.

1. What methods are available for plant breeders to make progress from selection in garlic?
2. What are some advantages and disadvantages of the reproductive strategy employed by the Pando aspen clone?
3. Describe the importance of somatic mutations and sexual reproduction in the development of apple varieties.
4. Compare parthenocarpy and parthenogenesis.
5. Give an example of apomixis in a familiar plant.
6. Briefly describe what apomixis involves, being sure to differentiate between the genetics of the embryo vs. the endosperm.
7. Briefly describe what is known about the genetic basis of epigenetics.
8. What is epigenetics and what does it have to do with apomixis?
9. In what ways does *Citrus* have the reproductive bases covered?
10. Compare the genome formulas and genome sizes of *Citrus* species with those of your favorite plant. Do you think the flavors and aroma of *Citrus* are related in any way to genome size?
11. How does degree of genetic diversity relate to reproductive strategy in *Citrus*?
12. How does knowledge of reproductive strategies help to explain why the Himalayan blackberry is such a successful invasive plant?
13. What is your opinion of Luther Burbank?

# Hand and Koltunow. Questions

1. Of what potential practical importance is apomixis to agriculture/horticulture?
2. Note how “diploid” is used in the review of “Sexual seed formation in flowering plants”. In what way is this usage is contrary to the guidelines provided for this class?
3. The review refers to a seven-celled embryo sac – how do you reconcile this with the eight-nucleate embryo sac referred to in class?
4. State, in your own words, the three common developmental components of apomixis.
5. Compare and contrast gametophytic and sporophytic apomixis.
6. Define the following terms, in your own words, based on the definitions provided in Table 1.
   1. Apomixis
   2. Embryo sac
   3. Apomeiosis
   4. Diplospory
   5. Apospory
   6. Parthenogenesis

**Supplementary Resources: Not required.**

1. Mule deer herbivory is a threat to Pando single genotype forest: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0203619>
2. Apple genome sequence: <https://www.nature.com/articles/s41438-019-0141-7>
3. Role of epigenetics in apomictic dandelions: <https://onlinelibrary.wiley.com/doi/full/10.1111/mec.13329>
4. Citrus genome sequence: <https://www.nature.com/articles/ng.2472>
5. The success of the Himalayan blackberry in British Columbia, Canada: <https://owlcation.com/stem/Himalayan-Blackberry-Plants-in-BC-Invasive-But-Beautiful>
6. Luther Burbank and Seattle’s blackberries: <https://www.npr.org/sections/thesalt/2016/08/29/491797791/the-strange-twisted-story-behind-seattles-blackberries>
7. Sexual reproduction in garlic. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4411974/>