

## Review Questions

Dr. Tignor: Unusual Types of Seed Development

1. Describe double fertilization.

*Pollen is transferred from anther to stigma. Pollen grain then germinates and subsequent pollen tube grows down through the style. Haploid nucleus from pollen parent fuses with haploid egg cell leading to formation of zygote. Fusion of haploid nuclei to form diploid zygote is fertilization. The second haploid nucleus from pollen parent also fuses with two haploid central cell nuclei (i.e. polar nuclei). This forms the triploid endosperm.*

2. What is meant by facultative and obligative apomixis? Which is more common?

*In facultative apomixis the plant produces both sexual and apomictic embryos. It is more common than obligate apomixis, in which only apomictic embryos are produced (non-sexual)*

3. In which types of apomixis does meiosis occur? How do the processes differ in each case?

*Nonrecurrent and apospory apomixis; in nonrecurrent, meiosis occurs normally. In apospory, megaspore goes through meiosis but cells degrade.*

4. Do polyembryonic seeds look different than normal seeds once germinated?

*Yes, when polyembryonic seeds germinate, more than one root and shoot comes out of the seed.*

5. Why is apomictic-produced citrus root stock beneficial?

*Since the root stock is grown from seed, they are free of most virus and viroid diseases.*

6. Describe the types of polyembryony

*Embryos bud-off from normal sexual embryo, form from nuclear tissue, multiple sacs form within an ovule, and a synergid functions as an egg cell.*

7. Can apomixis occur without polyembryony?

*Yes*

8. What are runts and bulls, and why are they culled from the lot?

*They may be zygotic off-type or sexual embryos, resulting in a plant genetically dissimilar to parent plant. These may not be as robust in the environment.*

9. List several advantages to creating crops that can reproduce apomictically.

*Any elite genotype could be transferred directly into a cultivar*

*Polygenic traits would be true.*

*Labor-intensive tissue culture in ornamentals could become superfluous.*

*Problems with virus transmission in vegetatively propagated crops like potatoes would be eliminated because apomictic seeds go through a single cell stage.*

*Apomictic crops would breed true for transgenic traits, avoiding production of undesired non-transgenic offspring through the segregation of heterozygotes.*