

Name:

BIOL415 Quiz #4:

1. Hybridization can have both destructive and creative effects on the evolution of species. Briefly describe one effect of each type (1 pt).

0.5 pts for each correct answer, including:

- merger of species/genetic assimilation via overwhelming gene flow
- transfer of adaptations via adaptive introgression
- reinforcement of reproductive barriers via selection for traits that reduce hybridization
- new species via homoploid or allopolyploid hybridization

2. The genus *Schiedea* (Caryophyllaceae), native to the Hawaiian Islands, includes 35 taxa, while its sister group only contains 3 species. What evidence would indicate that *Schiedea* has undergone an adaptive radiation? Explain in 2–3 sentences (2 pts).

For *Schiedea* to represent an adaptive radiation, the genus would have to be descended from a common ancestor (0.5 pts), have a significant increase in speciation rate relative to its sister group (0.5 pts), and a simultaneous increase in ecological and phenotypic diversity (0.5 pts) that is associated with increased fitness in each species' native environment (0.5 pts).

3. What is the difference between genetic swamping and demographic swamping (Todesco et al. 2016)? (2 sentences, 2 pts).

Gene flow from common species has put rare species at increased risk of extinction

- 1) by genetic swamping, where the local genotypes (or parental populations) are replaced by hybrids (1 pt)
- 2) by demographic swamping, where population growth rates are reduced due to outbreeding depression (or production of maladaptive hybrids) (1 pt)

4. Why might increased phenotypic plasticity slow adaptive change? 1-2 sentences (1 pt).

Phenotypic plasticity shields otherwise unfit genotypes from selection and reduces the overall fitness advantage of adaptive genotypes (1 pt).