CHAPTER 7 Answers to Questions

Question 7.1. The effective population size in this populations will be approximately 4 because there are many males, but only one female (see the table above the question and expression 7.2). Therefore, we expect to lose approximately $1/2N_e = 12.5\%$ of the heterozygosity from this population.

However, there is a good chance that almost all of the alleleic diversity is present in the 5,000 seeds in which the paternally derived allele is a random sample of the 500 trees in the population. For example, it is extremely unlikely to lose an allele at a frequency of 0.01 with a sample of 5,000: $(1\text{-}0.01)^{5,000}$ is approximately zero. Therefore, this bottleneck will have no or little effect on allelic diversity.

This results demonstrates that effective population size may not provide a good predictor of the rate of loss of allelic diversity.