



FIGURE 23.3. In asexual populations, mutator alleles can increase with the beneficial alleles that they cause. (A) If a modifier allele (*blue circles*) causes a large increase in mutation rates, then most beneficial mutations (*red circles*) may be caused by the modifier, even when the modifier allele is initially rare. The modifier will increase along with the beneficial mutation, but as it does so, will accumulate a load of deleterious mutations (*crosses*) and may be eliminated (A, right). However, other outcomes are possible. The modifier may fix in the population before being eliminated by the mutation load (B), or it may be boosted by successive beneficial mutations (C), so that it continues to increase despite the accumulating mutation load.