



**FIGURE 19.15.** A population bottleneck (A) tends to produce an excess of rare alleles, compared with the pattern seen in a population of constant size (B). Assuming that each mutation generates a novel allele (the infinite allele model), the alleles observed in the sample are shown by the letters below each figure. In A, every new allele is present in only a single copy (labeled b–d). In contrast, in a sample from a population of constant size (B), mutations tend to be present in multiple copies (b–d). The *dotted line* in A indicates a sharp reduction in population size; all the lineages coalesce in a common ancestor who survived this bottleneck. The *black dashes* indicate mutations.