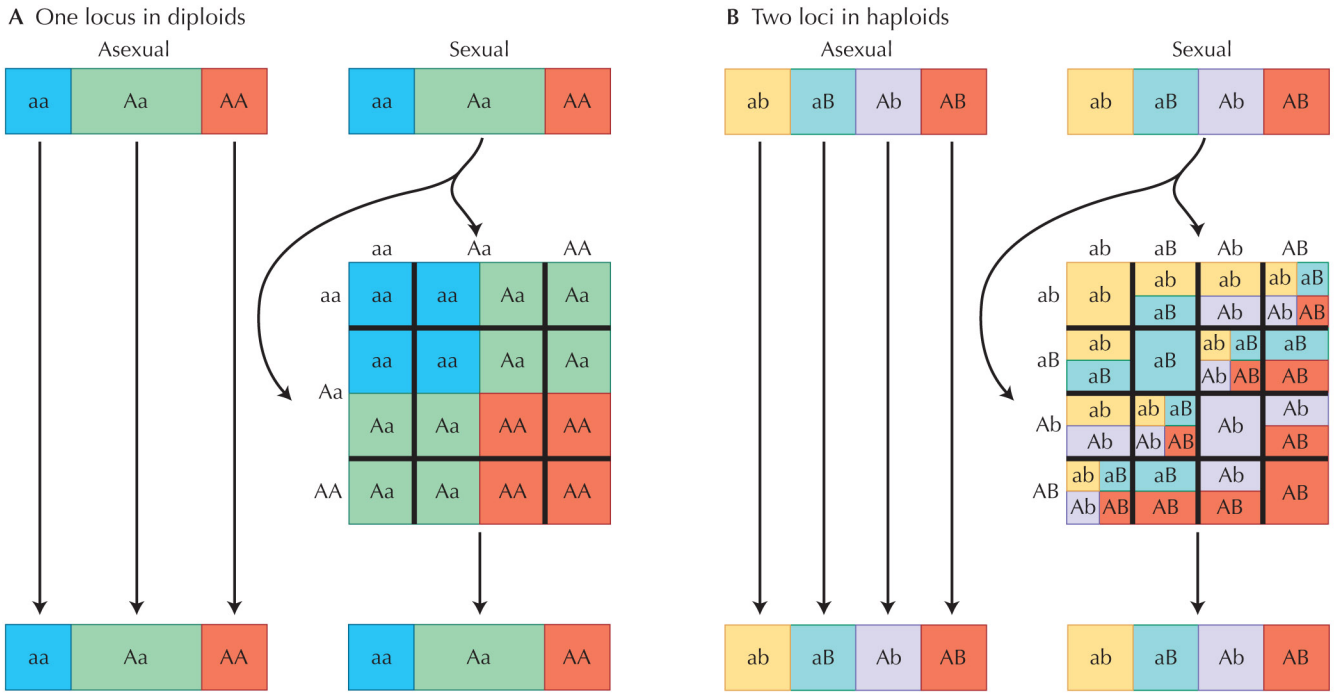

FIGURE 23.11. Sex and recombination alter the composition of a population only if there are nonrandom associations between genes. (*A*) With one locus, sex has no effect on a population that is in Hardy–Weinberg proportions. The *left-hand* diagram shows asexual reproduction, with each genotype producing identical offspring. The *right-hand* diagram shows sexual reproduction. The 4 x 4 diagram shows the 16 kinds of mating and their offspring: aa x aa produces all aa offspring (*top left*), Aa x Aa produces 1:2:1 proportions of aa:Aa:AA, and so on. The proportions in the next generation will be in Hardy–Weinberg proportions if mating is random. (*B*) Similarly, sex and recombination do not alter the proportion of haploid genotypes if there is linkage equilibrium. The diagram is as in *A*, but now with two loci, giving four haploid genotypes (ab, aB, Ab, AB).