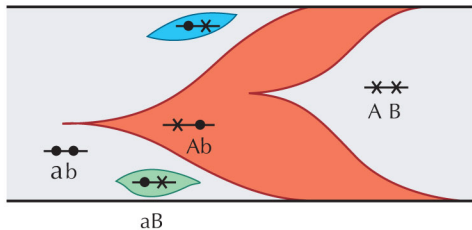


A Asexual



B Sexual

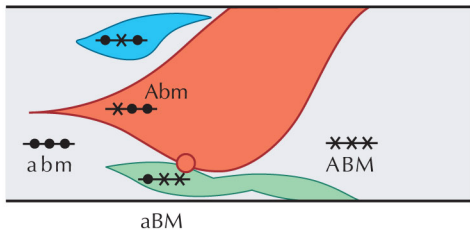


FIGURE 23.18. The Fisher–Muller argument. (A) Favorable mutations must be established sequentially in an asexual population. For example, if allele A is destined to replace a, then any favorable alleles that occur at other loci (B, for instance) can only be fixed if they occur within a genome that carries A. (B) With sexual reproduction, favorable mutations at different loci can be combined; this leads to an advantage to modifiers that causes sex and recombination. A favorable allele B that occurs with the unfavorable allele a can be fixed if it can recombine into association with A (*red circle*); if this requires that a modifier allele M be present, then allele M will also tend to increase by hitchhiking.

23.18, redrawn from Barton N. et al., *Science* **281**: 1986–1990, © 1998 American Association for the Advancement of Science