



**FIGURE 18.16.** The chromosomal cline in the grasshopper *Podisma pedestris*. (A) An adult male. (B) Chromosome pairs at male meiosis; the cross-like structures are **chiasmata** that correspond to recombination events (see Fig. 12.24). The *arrow* shows a fusion between the X chromosome and one of the autosomes. This is paired up with the homologous autosome, which is now acting as a Y chromosome. (Males of this species carry one X; females carry two.) (C) This fusion between the X chromosome and the autosome is found only in the southern Maritime Alps. Mixed populations and heterozygous females are found only within a narrow cline about 800 m wide (*red line*). This species is common above 1500 m (*shaded area*). (D) Detail of the cline at its southeastern end. The frequency of the fusion runs from about 90% at *lower left* to about 10% at *upper right*. (E) The frequency of the fusion plotted against distance along this region. Each point represents a sample of about 20 males.

18.16A,B, photos courtesy of Nick Barton; 18.16C, redrawn from Barton N.H. et al., *Nature* **341**: 497–503, © 1989 Macmillan, www.nature.com; 18.16D, photo courtesy of Nick Barton