

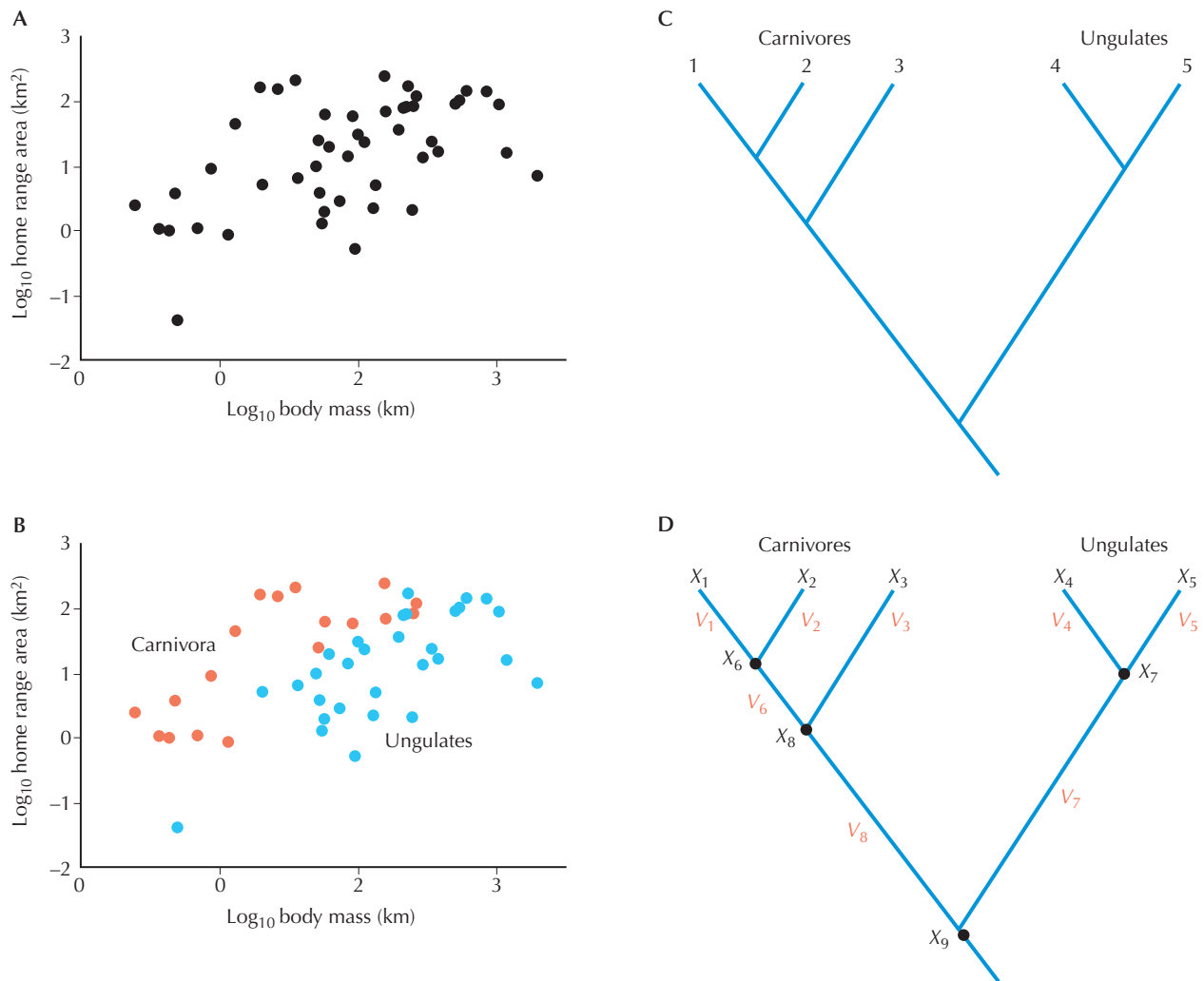


FIGURE 27.36. (A) Home range areas of 49 species of mammals in relation to their body size. Larger-bodied species tend to have larger home ranges. (B) When the phylogeny of the organisms is included in the analysis, it becomes clear that there are stronger positive correlations within each group (carnivores and ungulates) than when considered all together. The method of phylogenetic contrasts attempts to calculate correlations between variables in which phylogeny of the organisms is considered. It does this by calculating how the variables change along a tree of the organisms and then examining what the correlations are in the patterns of change (e.g., if as body size increases, does home range increase). (C) A hypothetical tree showing five of the species in A and B. (D) Calculating contrasts for the tree in C for variable X (e.g., body mass). First, the values for variable X are overlaid onto the tips of the tree ($X_1 - X_5$) for each species. Then contrasts are calculated for this variable along the tree. For example $X_1 - X_2$ is a contrast for the clade of species 1 and 2. $X_3 - X_6$ is the contrast for species 3 versus the ancestor of species 1 and 2. X_6 represents an inferred character state for the variable X for this ancestor. All other contrasts are calculated for the tree (e.g., $X_4 - X_5$). Then the contrasts are calculated for another variable Y (e.g., home range). The corresponding contrasts are then compared (e.g., $X_1 - X_2$ vs. $Y_1 - Y_2$) to each other, allowing one to determine if there are relationships in how these variables change along the tree. (A, Modified from Garland T. Jr. et al. *Syst. Biol.* **42**: 265–292, Fig. 2, © 1993 American Institute of Biological Sciences. B, Redrawn from Garland T. Jr. et al. *Syst. Biol.* **42**: 265–292, Fig. 2, © 1993 American Institute of Biological Sciences. C, Modified from McPeck M.A. *Am. Naturalist* **145**: 686–703, Fig. 1 © 1995 University of Chicago Press. D, Redrawn from McPeck M.A. *Am. Naturalist* **145**: 686–703, Fig. 1, © 1995 University of Chicago Press.)