



**FIGURE 11.20.** Variation in three-spined sticklebacks. (A) Drawing of a typical three-spined stickleback, which gets its name from the three spines on its back. This specimen also possesses pelvic spines (red arrow). (B) Skeleton preparation showing a marine stickleback (above) with a pelvis and pelvic spines (red arrow), but a lack of these structures in the benthic freshwater sticklebacks of Paxton Lake (below). (C) Map showing the location of Paxton Lake (red dot). (D) Over a relatively short period of time, an ancestral population of marine sticklebacks with pelvic spines (center fish) diversified into many morphologically distinct populations of freshwater fish with or without pelvic spines (surrounding fish).

11.20A, redrawn from <http://www.beesies.nl/stekelbaarsje.htm>; 11.20B, redrawn from [http://mednews.stanford.edu/mcr/archive/2004/04\\_21\\_04.html](http://mednews.stanford.edu/mcr/archive/2004/04_21_04.html); 11.20C, redrawn from [http://www.speciesatrisk.gc.ca/search/speciesDetails\\_e.cfm?SpeciesID=554](http://www.speciesatrisk.gc.ca/search/speciesDetails_e.cfm?SpeciesID=554); 11.20D, redrawn from Bell M. et al., *The Evolutionary Biology of the Three Spine Stickleback*, pp. 1–27, © 1994 Oxford University Press, [www.oup.com/uk](http://www.oup.com/uk)