



Figure 3.3. The appearance and development of ungulates and angiosperms (modified from Janis, 1976; Gentry, 1978; Hume, 1978; Hume and Warner, 1980; and B. A. Thomas and Spicer, 1986). All ruminant grazers are bovids and did not evolve until after the appearance of the grasses in the Miocene period. The American pronghorn antelope is the only extant antilocaprid; the Giraffidae are similarly reduced. (A) The ancestral artiodactyl common to both pigs and ruminants. (B) The common ancestor of Artiodactyla and Perissodactyla. The exact association of the various lines of ungulates is the subject of dispute. Recent cladistic studies suggest that the pronghorn antelope may be more closely related to bovids, and tragulids may be more related to tylopods. The existence of postulated ancestral groups A and B has been questioned (see Gentry and Hooker, 1988; and Janis and Scott, 1987, 1988). Furthermore, the Antilocaprinae have recently been included within the Bovidae (Hayssen et al., 1993), although they do not share a horn structure with the Bovidae (Figure 3.4). This association is indicated by a question mark.