1. Species characteristics and biology

Introduction

At the beginning of the twenty-first century there are 71 recognised species of kangaroo (Infraclass Marsupialia, Order Diprotodontia, Suborder Macropodiformes) found in Australasia. Of these, 46 are endemic to Australia, 21 are endemic to the island of New Guinea, and 4 species are found in both regions. The various species have a number of common names, including bettong, kangaroo, pademelon, potoroo, quokka, rat kangaroo, rock wallaby, tree kangaroo, wallaby and wallaroo.

Since the advent of the European settlement of Australia in 1788 the endemic kangaroo species have been affected in several ways. Most of the larger kangaroo species – those having a body weight over 20 kg – have had significant increases in their population numbers, as well as expansions of their former distributions. This group includes species with which most Australians are familiar, such as the red kangaroo *Macropus rufus*, the eastern grey kangaroo *M. giganteus,* the western grey kangaroo *M. fuliginosus* and the common wallaroo/euro *M. robustus*. At differing times, all of these have been or are still being harvested commercially.

A second group of kangaroo species has maintained its overall numbers. These species have either a mid-range body weight such as the agile wallaby *M. agilis* that has an average body weight of 11 kg in females and 19 kg in males, or species occupying reliable habitats such as the Herbert's rock wallaby *Petrogale herberti* and the allied rock wallaby *P. assimilis*. All of these species are common and have stable populations.

However, the third group, a large number of species mostly weighing less than 5 kg, have been affected negatively, and have had severe reductions in their numbers as well as in suitable available habitats. The reasons for their decline are many, including altered land use, predation, prevailing fire regimes, and competition from introduced herbivores.

While most of us can readily identify a kangaroo as a kangaroo, we are less able to describe the characteristics we use to determine whether or not an animal is a kangaroo. In most cases its body form, coupled with a bipedal hopping gait, gives us our main visual clues. The characteristic shape of the head, the relatively small thorax with small forelimbs, and the large abdomen with a large tail and hindlimbs, readily identify most kangaroo species. However, it is a series of internal body part characteristics that are conclusive indicators of identity. These range from the plumbing of kangaroos' reproductive tracts to the possession of a sigmoidal tubular stomach, which indicates that the animal is both a marsupial and a kangaroo.

However, in many cases it is not a live animal that we wish to identify, and in some cases not even a recently dead one. In such instances features of the skeleton, especially of the head, are critical to an identification.

The origins of modern kangaroos are unclear, but fossils, as well as modern molecular, immunological and biochemical analyses are gradually advancing our knowledge of their ancestry. Although there are conflicting theories on the basal interrelationships and systematics of the suborder Macropodiformes, in the