

3. Historical biogeography

This chapter introduces the historical biogeography of Australian palms and examines the development of the palm flora over time and space. Aspects of the fossil record are cautiously invoked to probe the deep history of palms in Australia. Palms are placed in the context of climate change across the Australian continent, adaptation and past and present regional distributional relationships.

■ THE FOSSIL RECORD

Compared to other areas of the world, Australia’s palm fossil record is limited (Greenwood and Conran 2000) and it is difficult to assign modern affinities or establish clear historical contexts. Harley (2006), in a summary of global palm fossils, described the world’s palm fossil record as ‘rich and widespread’ but cautioned against assigning modern affinity too freely. Overall, palm fossil records have a strong bias toward the northern hemisphere but indicate that the palm floras of some areas, such as Africa and India, were previously much more diverse than they are today (Pan *et al.* 2006). The earliest unequivocal palm fossils date from the Late Cretaceous and were recovered from sites in South Carolina and New Jersey (Berry 1914; Daghlia 1981; Dransfield *et al.* 2008).

Palms appear in the fossil record in Australia later than they do elsewhere in the world. The first indisputable records date to the Palaeocene and, with increasing diversity and distributional range, into the Eocene and Oligocene. They become less common through to the Late Miocene and Pliocene (Fig. 3.1). There are a number of possible reasons for the late first appearance of palm fossils in Australia, and for their lesser diversity compared to other areas:

- palms evolved elsewhere and only reached Australian landmasses following a later radiation;

ERA	Epoch	Age (myr)	
Cenozoic	Plio-Pleistocene	10	Onset of aridity
	Miocene	20	Contact with northern terranes
	Oligocene	30	First appearance of fossil stems
	Eocene	40	First appearance of fossil pinnae and fruit
	Palaeocene	60	First appearance of fossil pollens
Mesozoic	Upper Cretaceous	70	Rafting of Gondwanan land fragments

Figure 3.1 Geological time-scale with major events and estimated time of first appearance of palm fossils in Australia and New Zealand.

- the taphonomic potential may not have been available in the Australian environment, if palms were indeed present in the same numbers and diversity as elsewhere;
- sedimentary basins, where fossils have relatively greater potential to survive, have been eroded over much of the Australian landscape;