EARLY EVOLUTION OF PENGUINS

Summary

Penguins (Sphenisciformes) are extremely specialized seabirds from the Southern Hemisphere. The fossil record of this order covers most of the Cenozoic. The oldest representatives of Sphenisciformes come from the Paleocene of New Zealand (*Waimanu manneringi* and *W. tuatahi*) and the Antarctic Peninsula (*Crossvallia unienwillia*). These archaic penguins were large flightless birds differing in terms of body shape from their modern counterparts. Moreover, several lines of evidence indicate a lack of some adaptations within their locomotor functional morphology and physiology that are typical of recent penguins. The next epoch, Eocene, was characterized by a remarkable morphological, taxonomic and ecological diversity of early Sphenisciformes. The most numerous penguin remains have been found in the Antarctic Peninsula. So far, four genera and ten species (excluding debatable taxa) have been described. During Eocene, the recognized range of this order expanded to Australia and South America (Argentina, Chile and Peru). Significant or dominant component of the fossil assemblages were species characterized by large body size, often clearly exceeding in this respect their modern relatives (fossil genera *Anthropornis*, *Palaeeudyptes*, *Pachydyptes*, *Icadyptes* and *Inkayacu*). The considerable body size was in some cases accompanied by intriguing, from a functional point of view, morphological features, e.g. within the wing skeleton of the Antarctic *Anthropornis*. Interestingly, the only penguin feather fossils (assignable to the Peruvian *Inkayacu paracasensis*) are Eocene in age. Climate change, particularly severe cooling at the Eocene/Oligocene boundary, may have led to the disappearance of penguins, for some 20 million years, from the known fossil record of Antarctic faunas. The actual nature of this hiatus remains unknown, however. Oligocene penguins are known almost exclusively from New Zealand.