

New Records of Plio-Pleistocene Koalas from Australia: Palaeoecological and Taxonomic Implications

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ABSTRACT. Koalas (Phascolarctidae, Marsupialia) are generally rare components of the Australian fossil record. However, new specimens of fossil koalas were recovered during recent systematic excavations from several eastern Plio-Pleistocene deposits of Queensland, eastern Australia, including the regions of Chinchilla, Marmor and Mt. Etna. The new records are significant in that they extend the temporal and geographic range of Plio-Pleistocene koalas from southern and southeastern Australia, to northeastern central Queensland. We provide the first unambiguous evidence of koalas in the Pliocene Chinchilla Local Fauna (phascolarctid indet. and *Ph. ?stirtoni*): important additions to an increasingly diverse arboreal mammalian assemblage that also includes tree kangaroos. The persistence of koalas and local extinction of tree kangaroos in the Chinchilla region today suggests that significant habitat and faunal reorganization occurred between the Pliocene and Recent, presumably reflecting the expansion of open woodlands and grasslands. Other koala records from the newly U/Th-dated Middle Pleistocene Marmor and Mt. Etna fossil deposits (*Phascolarctos* sp. and *Ph. ?stirtoni*), along with independent palaeohabitat proxies, indicate the former presence of heterogeneous habitats comprised of rainforests, open woodlands and grasslands. The lack of such habitat mosaics in those regions today is likely the product of significant Middle Pleistocene climate change.

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Koalas (Phascolarctidae, Marsupialia) are Australian endemic, relatively large-sized (c. 10 kg), arboreal marsupials that occupy a similar ecological niche to placental lemuroids or sloths (Murray, 1984). The modern Koala, *Phascolarctos cinereus*, is the only surviving member of an ancient and diverse family of marsupials, with the oldest members known from the Late Oligocene (Black, 1999). Six to seven genera and 18 species (several undescribed) are currently recognized (Black, 1999). Phascolarctids are

separated from all other vombatiformes (i.e., wombats, marsupial “lions”, illarids, wynyardiids, maradids, and diprotodontoids) on the basis of their selenodont dental morphology and occupy a position near the base of the diprotodontian ordinal tree (Archer, 1976; Archer & Hand, 1987). A recent molecular phylogeny supermatrix, temporally-constrained using dated occurrences of fossil taxa, suggested that koalas diverged from vombatoids during the Middle Eocene (Beck, 2008).

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