

Functional and morphometric analysis of a middle Miocene bandicoot (Marsupialia, Peramelemorphia) skeleton from the Riversleigh World Heritage Area, Australia

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Peramelemorphia comprises four families: the extant Peramelidae (bandicoots), and Thylacomyidae (bilbies); the recently extinct Chaeropodidae (pig-footed bandicoot); and the extinct Yaralidae; with at least ten fossil species of uncertain familial affinity designated as *Perameloidea incertae sedis*. Extant taxa (18 species) are characteristically omnivorous, small to medium sized (0.1-4.9 kg) semi-fossorial/fossorial marsupials with a quadrupedal bounding gait. They occupy varied habitats from desert to rainforest in Australia and New Guinea. Fourteen pre-Pliocene taxa are currently described on the basis of cranial and/or dental material, yet none is known from its postcranial skeleton.

Here we use qualitative morphological and morphometric data to analyse a partial skeleton of a new species of bandicoot from a middle Miocene cave deposit, AL90 Site, in the Riversleigh World Heritage Area. AL90 has been radiometrically dated at 14.7-15.1 Ma, however the species is abundant in numerous early to middle Miocene deposits at Riversleigh. The AL90 specimen preserves the skull and dentaries, the fore- and hindlimbs, and elements of the manus, pes and axial skeleton. The species is estimated to have weighed approximately 300g (based on predictive marsupial craniodental regression equations) which is comparable among extant bandicoots to *Perameles bougainville* (Western barred bandicoot). Unlike modern species, the appendicular skeleton of the fossil taxon is less well-adapted for scratch-digging and fossorial behaviours. A striking contrast is the relatively elongate, gracile bones of the antebrachium of the fossil taxon compared with the generally short, robust forearm of modern bandicoots. Collectively, our data indicate a more generalized niche for this species than crown group peramelemorphians and may support suggestions that archaic bandicoots filled an ecological niche later dominated by small dasyurids during the late Cainozoic.