Kangaroo evolution linked to climatic change

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(PhysOrg.com) -- The evolution of kangaroos is intricately tied to Australia's changing climate, according to new research.

In the first anatomical study of the entire skeletons of both modern and fossil species, Flinders University palaeontologist Dr Gavin Prideaux and Murdoch University anatomist Dr Natalie Warburton have pieced together the most reliable and detailed kangaroo family tree to date.

Their findings, published this month in the *Zoological Journal of the Linnean Society*, show how the abundance and diversity of macropods - including kangaroos, wallabies and tree-kangaroos - matches the spread of woodlands and grasslands in Australia as forests retreated to the coast over millions of years.

“Kangaroos and wallabies have long been recognised as potentially ideal barometers of historical climatic change in Australia,” Dr Prideaux said.

“They have been around for at least 30 million years, but difficulties in working out which species are related and when certain lineages evolved have hampered research for more than a century,” he said.

By comparing skeletons from 35 living and extinct macropod species, the researchers established that while early forms were adapted to the abundant soft-leaved forest plants, but later macropods had to adapt to more arid conditions.

“We see clear changes through time in teeth and skull shape that reflect diets of tough leaves and grasses, and parallel changes in foot anatomy that reflect an improved ability to hop longer distances through more open habitats,” he said.

The scientists argue that the Macropus lineage, which contains the red and grey kangaroos and some wallabies, represents the peak of marsupial evolution.

“Macropus has been around for four million years and has more living and extinct species than any other marsupial genus. They are a great Australian success story,” Dr Prideaux said.

The study also confirms previous DNA evidence about the relationships of the highly endangered merrnine, a small wallaby restricted to two tiny Western Australian islands.

“The merrnine is the sole living survivor of a unique branch of the macropod evolutionary tree that split off around 20 million years ago, but we know very little about the animal. While its conservation is a priority, studies of its biology should teach us a lot about the formative steps in macropod evolution,” Dr Prideaux said.

Provided by Flinders University