

How cathedral termites got to Australia to build their 'sky-scrapers'

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Mounds of the cathedral termite *Nasutitermes tridiae* at Litchfield National Park. Credit: Jan Sobotnik.

They build among the tallest non-human structures (proportionately speaking) in the world and now it's been discovered the termites that live in Australia's remote Top End originated from overseas - rafting vast distances and migrating from tree-tops to the ground, as humans later did.

Referred to as "cathedral" termites, the *Nasutitermes tridiae* build huge [mounds](#) up to eight metres high in the Northern Territory, Western Australia and Queensland - representing some of the tallest non-human animal structures in the world.

DNA sequencing found the forebearers, called nasute termites, colonised Australia three times in the past 20 million years or so and evolved from wood to grass-feeding as they adapted to significant environmental changes, including increasingly arid conditions and the conversion of woodlands to grassland habitats in subtropical savannahs and central Australia.

Now a prominent feature of the arid landscape

"Down Under", the mounds house millions of termites; this study is the first comprehensive investigation of the evolution of the nesting and feeding of the extended family of termites, through the Australian refugee descendants.

The findings of the international research are published today in the Royal Society journal *Biology Letters*.

Co-lead author of the paper from the University of Sydney, Associate Professor Nathan Lo, said although much was known about the functions of [termite mounds](#) - which include protection from predators - little had been known about their evolutionary origins.



A closeup of *Nasutitermes tridiae*. Credit: Toru Miura.

"We found that the ancestors of Australia's fortress-building termites were coastal tree-dwellers, which arrived in Australia by rafting long distances over the oceans from either Asia or South America," Associate Professor Lo said.

"Once in Australia, they continued to build their nests in trees, but later descended and began building mounds on the ground instead, paralleling

the evolution of the other great architects of the world - human beings, whose ancestors lived in the tree tops some millions of years ago."

Associate Professor Lo, from the University of Sydney's School of Life and Environmental Sciences, said the mounds are an engineering feat when considered in comparison to the tallest structure on Earth - Dubai's skyscraper the Burj Khalifas.

"Given that a worker termite stands about 3mm in height, these mounds are in human terms the equivalent of four Burj Khalifas stacked on top of each other," he said.



Nasutitermes triodiae also at Litchfield NP. Credit: Toru Miura.

The paper, "Parallel evolution of mound-building and grass-feeding in Australian nasute termites," said ancestral wood feeders would likely have lost the ability to feed on wood as they transitioned to feeding on litter and grass.

"This group is one of the most ecologically successful groups of [termites](#) in Australia," the paper reads.

"We have shown that its capacity to disperse over oceans - and to repeatedly evolve the ability to build mounds and feed on novel substrates in the face of significant environmental change - appears

to have been important in promoting this success."

More information: Parallel evolution of mound-building and grass-feeding in Australian nasute termites, *Biology Letters*, [rsbl.royalsocietypublishing.org1098/rsbl.2016.0665](https://rsbl.royalsocietypublishing.org/doi/10.1098/rsbl.2016.0665)

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