

The evolutionary history of termites as inferred from 60 mitochondrial genomes: dating the rise of tropical ecosystem engineers

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Thanks to their complex social organisation, termites have colonised many new habitats and nowadays are amongst the most abundant animals in tropical ecosystems. During their evolution they have diversified ecologically and got adapted to new habitats and food sources, modern species feeding on all kinds of organic matter along the wood-soil decomposition gradient. To resolve the precise timing of termite ecological diversification, we sequenced the mitochondrial genome of 42 termite species, which with the already sequenced 18 mitochondrial genomes, are representative of the termite diversity. Using these data, we built a phylogenetic tree and computed molecular clock using multiple fossil records as calibration points. Unlike previous phylogenetic studies based on smaller dataset, our phylogenetic tree is fully resolved for lower termites, Macrotermitinae and Apicotermitinae; however, members of other subfamilies of Termitidae are still ambiguously placed on the tree. Our molecular clock tree shows that termites split off from *Cryptocercus* roaches 150 millions years (My) ago, that modern Termitidae are 55 My old and that the crown termitid group composed of Termitinae + Syntermitinae + Nasutitermitinae + Cubitermitinae is 40 My old. This implies that Termitidae diversified after the breakup of Gondwana, and therefore, their present worldwide distribution is the result of dispersion. The precise timing of major dispersal events is still unknown and deserves further examinations.