

DK 531 F08

## Biodiversity and continental drift

Ectomycorrhizal fungi, in symbiosis with the roots of their host trees, play an essential part in the functioning of forest ecosystems. They form an underground network of mycelium threads that connects the roots of different trees, enabling nutrients to circulate. The mycelium threads explore the soil far more finely than roots and so improve uptake of minerals and water by their partner trees.

As part of a titanium mining project by Qit Minerals Madagascar (QMM), researchers from LSTM (a IRD-CIRAD joint unit) studied biodiversity in ectomycorrhizal fungi in the coastal forests around Fort Dauphin, Madagascar. The researchers discovered a new family of ectomycorrhizal trees, the Sarcolaenaceae, endemic to Madagascar – the first discovery of this kind since the 1950s.

Phylogenetic analyses showed that the Malagasy Sarcolaenaceae share with the Dipterocarpaceae (a family of trees widespread in Southeast Asia) a common ancestor, probably of Gondwanan origin. When India and Madagascar separated about 88 million years ago, the common ancestor of the Sarcolaenaceae and Dipterocarpaceae is thought to have been carried to the Asian block, where the Dipterocarpaceae then spread. Today, this family is one of the world's most widespread forest formations and dominates the world market in tropical timber. It is a basic resource for many Southeast Asian countries.

The LSTM researchers, in partnership with QMM, Fofifa in Antananarivo and the Museum National d'Histoire Naturelle in Paris, have shown that, given the biodiversity among the ectomycorrhizal fungi associated with these two tree families, it is unlikely that the two acquired the symbiosis separately. The symbiosis must have existed before India and Madagascar separated, and is therefore more than 88 million years old. To date, the only tangible element for estimating the age of ectomycorrhizal symbiosis had been a 50-million-year-old fossil root.



• The fungi one finds in the countryside are the aerial parts of underground networks of mycelium. These *Russula* fungi from Madagascar are the fruiting bodies, or sporophores, that reveal the presence of an underground symbiosis system that is as necessary for the tree as for the fungus,

