The kapok connection -- Study explains rainforest similarities

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Kapok trees are challenging the notion that African and South American rainforests are similar. Credit: Zina Deretsky, National Science Foundation

Celebrated in Buddhist temples and cultivated for its wood and cottony fibers, the kapok tree now is upsetting an idea that biologists have clung to for decades: the notion that African and South American rainforests are similar because the continents were connected 96 million years ago.

Research by University of Michigan evolutionary ecologist Christopher Dick and colleagues shows that kapok---and perhaps other rainforest--trees colonized Africa after the continents split when the trees' seeds traveled across the ocean.

The findings, funded by the National Science Foundation (NSF), appear online this week in the journal *Molecular Ecology*.

"This research provides vital information for one of the most highly threatened areas of the planet, tropical rainforests," said Sam Scheiner, program director in NSF's Division of Environmental Biology, which funded the research. "In order to plan for and mitigate global climate change, we need to understand the history of life on Earth through studies like this one."

Oceanic dispersal links the world's rainforests, said Dick, "and this study is one of the first to catch that process in action at the species level. Although single seeds are very unlikely to survive an oceanic voyage and then successfully become established elsewhere, such improbable events become probable over 10 to 15 million years."

Dick studied the rainforest form of Ceiba pentandra, a species of kapok that grows taller than a 16-story building, its head poking above the forest canopy.

Its flowers produce more than 50 gallons of nectar per tree in a season, attracting bats that travel as far as 12 miles between trees and transfer pollen in the process. When the seed pods ripen, they break open to reveal fluffy fibers that are used to stuff pillows and mattresses. The seeds, which are about the size of a sunflower seed, are buoyant and able to float down rivers along which the colossal trees grow.

Dick and colleagues investigated which of several possible scenarios could be the reason for the current distribution of Ceiba pentandra.

Dick concluded that extreme long distance travel by wind or ocean currents explains how the trees spread from South America to Africa. He plans to continue investigating the role of oceanic dispersal to see if the same is true for other species and for entire plant communities.

"This tree has become locally extinct in parts of the Peruvian Amazon as

a result of overexploitation for plywood," Dick said. "It might be saved from widespread extinction by continuing to invade new land areas through oceanic dispersal."

Source: National Science Foundation