

Primates indispensable for regeneration of tropical forests

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Moustached tamarins (*Saguinus mystax*) contribute crucially to the seed dispersal of the neotropical tree *Parkia panurensis*. Credit: Julia Diegmann

Primates can influence seed dispersal and spatial genetic kinship structure of plants that serve as their food source. This is the result of a cooperation project of behavioral ecologist Eckhard W. Heymann from the German Primate Center (DPZ) with plant geneticists Birgit

Ziegenhagen and Ronald Bialozyt from the Philipps-University Marburg. This study was funded by the German Research Foundation (Bialozyt et al., *Trees*, 2014).

At the DPZ-field station Estación Biológica Quebrada Blanco in the Peruvian Amazonian lowlands, scientists studied how feeding, sleeping, and ranging habits of two species of New World monkeys affect the dispersal of the neotropical legume tree *Parkia panurensis*. For this, the researchers observed a group of Brown-mantled [tamarins](#) (*Saguinus nigrifrons*) and Moustached tamarins (*Saguinus mystax*), who jointly moved through home ranges in search of edible plants which included *Parkia* [trees](#).

Fruits from these trees are pods that contain 16 to 23 seeds, each of which is surrounded by edible gum. The monkeys feed on the gum content of the pods and at the same time swallow the *Parkia* seeds which are later defecated intact in a different area.

During behavioral observations, researchers recorded the food intake of tamarins as well as the location of the *Parkia* trees that they visited. In addition, they collected faecal samples of the tamarins that contained seeds. "With the help of genetic analyses of the DNA found in the seed coat, which is of maternal origin, we could make an exact assignment of the corresponding "mother tree" for the seeds", says Eckhard W. Heymann from the DPZ. "This allowed us to determine how far *Parkia* seeds were dispersed by the monkeys."

In order to analyze the effect of [seed dispersal](#) by monkeys on a spatial genetic level, the scientists examined three different developmental stages of the trees. In addition to the seeds that contain the plant embryo, they collected leaves from young and mature *Parkia* trees in the home range of tamarins. "With the help of analysis from microsatellites, short repeated DNA sequences, we were able to identify genetic similarities of

individual trees", says Heymann.

The analysis of the spatial genetic structure of the *Parkia* population revealed a significant genetic relationship of the plant embryos and young trees within a radius of 300 meters, which coincides with the distance within which most seeds are dispersed by the tamarins. For mature trees, the relationship was reduced to a radius of only up to 100 meters.

"In tropical rain forests, the seeds of 80 to 90 percent of trees and lianas are dispersed by animals. In addition to primates, birds and bats are the major animal groups that are responsible for seed dispersal", says behavioral ecologist Heymann. "For the plants, transport of their seeds is extremely important. As sedentary organisms, this is the only way that their offspring - the embryos contained in the seeds - can reach appropriate sites for germination and growth. Furthermore, this reduces the density-dependent mortality which occurs when the [seeds](#) fall under the mother plants," says Eckhard W. Heymann. Fruit-eating primates such as tamarins are therefore invaluable to the natural regeneration and diversity of ecosystems in which they live.

More information: Bialozyt, R., Lüttmann, K., Michalczyk, I.M., Saboya, P.P.P., Ziegenhagen, B., Heymann, E.W. (2014): "Primate seed dispersal leaves spatial genetic imprint throughout subsequent life stages of the Neotropical tree *Parkia panurensis*." *Trees* [DOI: 10.1007/s00468-014-1061-7](https://doi.org/10.1007/s00468-014-1061-7) (open access)

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