Can Tropical Forests Recover After Major Disturbance?

Source: oikosjournal.org

Published: August 23, 2016

Géraldine Derroire

Can tropical dry forests recover their species richness and composition after major disturbance?

Secondary forests recovering after previous deforestation account for a substantial proportion of the world's remaining area of tropical forest and their importance is expected to increase in the future. Assessing the resilience of tropical forests is key to understanding their potential for conservation and provision of ecosystem services. The capacity of secondary forests to conserve plant biodiversity depends on the recovery of plant species richness (the number of species) and composition (which species) after the previous land use is abandoned. Of all the types of tropical forest, dry forests are threatened by an especially high rate of deforestation, and are of high importance for global biodiversity, yet they have been much less researched than tropical rain forests. Our recent study presents a quantitative synthesis of 13 published studies on tropical dry forests recovering after agriculture. Our objective was to assess the trends in recovery of the richness and composition of tree and shrub species, and identify the factors explaining possible differences in recovery between the forests.

Secondary tropical dry forests at different times after abandonment of the previous agricultural land use in Guanacaste, Costa Rica.

Our results show that species richness increases with time after abandonment of the previous land use. Tree and shrub species do gradually colonise and establish in secondary forests, which can reach levels of species richness comparable to those of old-growth forests after a few decades. Secondary tropical dry forests therefore show good potential for the conservation of a large number of plant species. The species composition of the secondary forests also becomes increasingly similar to those of old-growth forests. However, this change happens at a slow rate, suggesting that the full composition of old-growth forests may never be recovered.

We also found important differences in the rate of change in species richness and composition between the studied forests. Surprisingly, these differences are not explained by the precipitation regime or the availability of water, nor by the type of land use before forest recovery. This indicates the complex interaction of factors affecting the recovery of forests and supports the need for further research on the importance of the legacy of past land use and the role of the surrounding landscape in the recovery from human impacts of the globally important, conservation priority tropical dry forests.