Why legumes dominate recovering Neotropical forests

Across the tropics, forests that have never felt the axe's blade or the torch's fire become less and less common every day. But although they continue to be harvested for timber or cleared for agriculture, tropical forests are resilient and are able to make their return once the logging is finished or the agricultural lands are abandoned. These so-called 'secondary forests' now make up more than half of all tropical forest area worldwide and are important carbon stores and habitats for biodiversity. Quite commonly, regrowing forests include a different combination of species than was found in the original old-growth forest at the same location. And in the Neotropics, no plants are more successful when colonizing those fresh secondary forests than the legume family. Through a comprehensive synthesis of forest data from nearly four dozen sites in eight Latin American countries, my colleagues and I showed that legumes are a common element of regrowing forests across much of the Neotropics. And the ecological success of legumes is even greater in seasonally dry forests than in their wet forest counterparts. The potential to fix nitrogen (N_2) through symbiosis does indeed offer legumes a critical advantage in these harsh, dry environments, but it is also not the only secret to their success. Having leaf traits related to drought tolerance and water-use efficiency is also important because they allow certain legume species to conserve water more efficiently and better cope with hot dry conditions. Our pan-Neotropical survey should lead to more accurate estimates of natural N_2 fixation, and also support efforts to restore disturbed forests across the region. And as the tropics become hotter and drier, our results suggest legumes may hold the pole position in the race to gain the first foothold in the forests of the future.