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Plan traits and litter decomposition of neotropical tree species

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The link between plant characteristics and ecosystem processes is important for the sustainability of the agro ecosystems and has received too limited attention especially in the high diversity tropical lands continually threatened by land use changes from forest to agricultural systems. This research explores for the first time the relation between plant functional traits, decomposition rates and nutrient releases of 37 Nicaraguan tree species with different capacities to naturally regenerate in agricultural lands such as anthropogenic pastures. A total of 17 plant traits related to four main trait variability dimensions like i) leaf, ii) stem ii) height and iv) reproductive spectrums were measured on adult trees (dbh $\geq$ 10 cm). A decomposition experiment under controlled conditions was established for monthly litterbags collection during four months and seven chemical traits were measured on leaves, fresh and decomposed litter. Finally, the abundance of saplings and seedlings of such species was surveyed in managed pastures. We expand actual knowledge of the afterlife effect of leaf traits directly to decomposition dynamics, carbon and nutrient cycling including a higher number of tropical tree species than previous studies. We found that tree species with high P, N, C in green leaves have also high P, N, C in fresh litter and that tree species with acquisitive leaves decompose faster, release more N, P and C than more conservative species. However, our results extend even further this afterlife effects linking also particular C fractions contents of green leaves to different decomposition dynamics. Another novel result was to observe that in addition to leaf traits, also stem and reproductive traits are related with differences in litter quality, decomposition rates and macronutrients releases during decomposition, thus linking the afterlife effect of leaf traits directly with tree natural regeneration capacity. These significant relationships outline that more abundant trees tend to have faster decomposition rates while less abundant tree species tend to present slow leaf-decomposition rates. Our findings indicate that plant characteristics are linked with ecosystem processes like litter decomposition and tree natural regeneration having particular implications for nutrient and carbon cycling in agricultural ecosystems having probable effects on their sustainability.