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Timber Regeneration in Treefall Gaps of Certified, Conventionally Managed, and National Park Forests in Northern Honduras

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Abstract

In the Río Cangrejal water-shed, northern Honduras, 4419 ha of humid lowland forests have been certified since 1993 through the SmartWood Programme, accredited by the FSC. This forest certification programme promotes sustainable management of forests and certification is given if management fulfils certain social, economic, and ecological criteria. The ecological criteria for certified forestry include limiting harvest intensity and minimising mechanical damage of logging. Based on these requirements, we hypothesised that in comparison to conventionally managed forests, the logging gaps of certified forests host more established saplings of timber trees, due to a higher abundance of seed trees left in the forest, and provide more favourable environments for the establishment and growth of timber seedlings, due to the control of negative logging impacts. We tested these hypotheses, using regeneration data of ten shade-tolerant neotropical timber species (n=46 treefall gaps). We analysed twelve ecological gap characteristics as determinants of sapling abundance, using a statistical approach that emphasises their sensitivity to the forest management system as well as their ecological role. We found that gaps in certified forests were characterised by lower levels of logging-related disturbance than gaps in conventionally managed forests. However, differences were relatively small, since loggings are done at low intensity and without heavy machinery in the area, in conventionally forests as well. Despite the more favourable gap environment, regeneration success was poorer in certified forests than in conventionally logged forests. As expected, highest regeneration was found in natural forests. The good regeneration success in conventionally logged forests was largely due to the high abundance of *Mortoniiodendron vestitum*. To explain the remaining differences in regeneration between management types, we suggest that loggings in certified forests have been more intensive in the past, leading to a scarcity of timber seed trees. We further propose two alternative explanations related to treefall gap frequency: low logging intensity after certification may have led to low frequency of treefall gaps, limiting the recruitment of timber species; or intensive loggings currently maintain an environment with too much disturbance for the success of timber regeneration.

Keywords: Forest certification, FSC, Logging, Natural regeneration, Reduced-impact logging, Shade-tolerant timber

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