Soundscape measurements to evaluate impacts of habitat degradation on acoustic animal communities

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Abstract

Ecosystems around the world are under threat from a multitude of global change disturbances. One of the most important is certainly habitat degradation. A new, emerging science, named soundscape ecology, studies the acoustic processes and associated ecological patterns occurring within a landscape. This science holds promise in addressing the ecological challenges of global environmental change. Here, we investigate how natural soundscapes respond to disturbances. More precisely, we evaluate the impact of two habitat degradation regimes on singing animal communities, i) the deforestation in New Caledonia and ii) a wildfire event in the Chiricahua National Monument, Arizona, USA.
New-Caledonia is a biodiversity hotspot where deforestation is considered as one of the major threats to biodiversity. Cricket species compose a large part of the acoustic animal community. We evaluated cricket's diversity along a gradient of habitat degradation. For each location, acoustic recorders were placed during two weeks and a taxonomic inventory was conducted. Acoustic diversity indices were then calculated for the acoustic recordings. The first results of the analysis of these indices reveal a significant modification of acoustic diversity reflecting a change in community composition.

In 2011, a wildfire spread across the Chiricahua National Monument leading to a new spatial heterogeneity pattern. Recorders were placed in locations ranged by different wildfire severity levels, in four different life zones. Similarly, we compared the acoustic diversity with regard to different modalities. Plans are to conduct this study for several years in order to monitor the recovery process of severely disturbed ecosystems.
The results of these two studies will provide robust elements to support the use of soundscape measurements to evaluate disturbance impacts on natural ecosystems.

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