

## Intensification of forest for coffee production affects mammals in Ethiopia

A study with camera traps in Ethiopia by Biodiversity Inventory for Conservation (BINCO) found that intensification of natural forest for coffee production by clearing understory and removing trees alters the large mammal communities. Although overall species diversity remained constant, large and medium sized carnivores are the first to disappear and diurnal activity patterns are shifted to nocturnal. "As expected, the increased accessibility of coffee forests decreases the diurnal activity of large mammals and specifically affects the top predators in the ecosystem" point out the researchers.

Being the birthplace of coffee, earlier studies have shown that Ethiopian coffee forest is one of the most biodiverse in the world in terms of bird species (Buechley et al., 2015). This is the first study in Africa that shows a similar trends for mammals, with a mammal diversity in coffee forest comparable to that of mature natural forest. "The high demand for coffee internationally results in an ongoing intensification of natural forests and thus little undisturbed forest remains in Ethiopia" says Dr. De Beenhouwer, who led the study. "This study therefore indicates the importance of coffee forest in Ethiopia for mammal conservation, where coffee has been cultivated as a shade crop for more than 1,000 years".



Managed coffee forest on the left and a Bushpig in natural forest (right), a mammal that was common in both natural forest and shade coffee, although predominantly nocturnal in shade coffee whereas diurnal in natural forest. © L. Geeraert (Left picture) and © M. De Beenhouwer (Right picture).

Although Ethiopia is known for its high number of both animal and plant species that do not live anywhere else in the world, there is a concerning lack of conservation activities to preserve the biodiversity locally. Moreover, the extent of agricultural land is rapidly increasing at the expense of natural forest, resulting in a significant loss in biodiversity. Coffee forest, however, has since long been proposed as a more sustainable agricultural system, conserving biodiversity while providing income for local communities.

In this study, large carnivores such as leopard and African civet showed a tendency towards natural forest, while crested porcupine and Ethiopian hare were typically associated with coffee forest. The latter two species are not commonly associated

with forest, so their presence in coffee forest may be related to increased forest accessibility and a well-developed herb layer in coffee forest compared to natural forest.

Mammal activity in natural forest peaked during daytime. The activity pattern in coffee forest, on the other hand, was predominantly crepuscular and nocturnal, which may be a direct adaptation to frequent human disturbance. Both forest buffalo and leopard, for example, were only observed at night in coffee forest. Despite the high mammal diversity in coffee forest, it is important to recognise that it cannot fully replace natural forest as a habitat for large mammals.



Figure 2. Leopard (*Panthera pardus*), threatened with extinction (IUCN red list, 2018) but common in natural forest. © M. De Beenhouwer

The complete loss of natural forest in combination with increased human disturbances may result in the local extinction of top predators such as leopard, which can subsequently trigger negative effects on other forest components such as decreased forest restoration due to higher pressure of herbivores. "Our study shows the value of coffee forest as corridors and buffers around natural forest" says Dr. De Beenhouwer. "Therefore, a balanced landscape mosaic of coffee and natural forest may be a valuable conservation option, contributing to local economy while safeguarding the diversity of large mammals".

*BIODIVERSITY INVENTORY FOR CONSERVATION (BINCO): BINCO is a Belgium-based, but internationally engaged, non-profit organisation. Founded in 2008, BINCO specialises in biodiversity assessments and monitoring, focussing on poorly studied regions and species. It aims to compile crucial knowledge of the biological world through targeted field research in support of conservation NGOs, government and others to help make informed decisions to protect the natural capital in this world.*

If you would like to read more about this study, the paper '[From natural forest to coffee agroforest: implications for large mammal communities in the Ethiopian highlands](#)' is now freely available until 31/11/2018 in Oryx—The International Journal of



Conservation. The study was funded by [Rufford Foundation](#) and [Idea Wild](#).

Cover photo: Camera trap installed in Coffee Forest in Southwest Ethiopia © J. Mertens