
Shaded coffee and the stability of rainforest margins in northern Latin America

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Summary

Most native forests in Latin America are highly fragmented. In the mid elevation areas of Northern Latin America, the agricultural matrix is frequently composed of coffee. In this region, coffee has been traditionally cultivated under the diverse canopy of shade trees, representing a high quality matrix that can contribute to the social and ecological stability of the region. This agroforestry system has been proven to be important for biodiversity conservation. Studies over the last fifteen years have shown that shaded coffee plantations maintain a high diversity of vertebrates, invertebrates and plants. These organisms play an important role in the functioning of coffee agroecosystems. Shaded coffee plantations promote a high abundance and diversity of natural enemies that help to regulate herbivores, weeds and diseases. Shaded plantations also harbor a higher diversity of native pollinators which have been shown to contribute to higher coffee yields. Likewise, the diverse shade-tree component contributes to soil fertility and soil conservation and has been shown to contribute significantly to carbon sequestration. As a matrix, coffee agroforests also contribute to the conservation of biodiversity within

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forest fragments by promoting migration among fragments and facilitating a metapopulation structure. Three “sustainable” coffee certification programs have been developed to help farmers cope with the vagaries of the market: organic, fair-trade and biodiversity-friendly (or shade-grown). Although certified coffees still represent a small niche market, they have the potential to promote conservation and benefit the livelihoods of small producers. Especially under conditions of low international coffee prices, as those experienced in the first years of this century, these certification programs have contributed to the ecological and socio-economic stability of the coffee growing regions of northern Latin America.

Keywords: coffee agroecosystems, Latin America, certification programs, function of biodiversity, intensification

1 Introduction: Coffee agroecosystems and the stability of forest margins: a general framework

Most of the forest in the Neotropics is already highly fragmented. The predominant landscape in these regions consists of small to medium size forest fragments surrounded by a sea of managed systems, the agroecological matrix. The ecological and socio-economic stability of such landscapes depends on how this matrix is managed. A mosaic of diverse cropping and land use systems that are managed for both ecological and socio-economic goals of the local population would prevent the further erosion of the natural areas and would maintain biodiversity at the landscape level. In this chapter we review the role of the coffee agroecosystem in mid elevation regions of Northern Latin America in maintaining both the ecological and socio-economic stability of the region.

Before we examine the case of coffee in particular it is important to establish a more general framework for the need to integrate the agroecological matrix in conservation strategies. There are 5 reasons for doing so: 1) most tropical habitats in the region are already highly fragmented, 2) extinction rates are high even in large forest fragments, 3) the matrix itself is sometimes an important repository of biodiversity, 4) the matrix provides migration pathways from fragment to fragment, and 5) agriculture is not a permanent activity (Vandermeer et al. in press). With this framework we argue that conservation needs to be refocused, away from preservation areas and towards the matrix in which fragments of native habitat are situated. Vandermeer and colleagues (in press) argue that this is especially so in the light of what we now know about extinction patterns in fragments, metapopulation dynamics, biodiversity patterns in agroecosystems, movement patterns of various organisms, and postagricultural succession. Yet a focus on the matrix means taking part in the debates on the nature of development within the agricultural context, and, more specifically, modifying the paradigm that there is an intrinsic