Tropentag, September 14-16, 2010, Zurich

"World Food System —
A Contribution from Europe"

Improving Banana Production in Coffee Agroforestry Systems in Central America

Christian Dold[1], Charles Staver[2], Pablo Siles[2], Oscar Bustamante[2], Paulo Dos Santos Faria Lichtemberg[1], Luis Pocasangre[2], Jürgen Burkhardt[1]

[1] *University of Bonn, Institute for Crop Science and Resource Conservation, Germany*
[2] *Bioversity International,*

Abstract

Sixty smallholders intercropping coffee, banana (*Musa* spp.) and trees in Central Costa Rica and Northern Nicaragua were described, of which twenty farms were intensively investigated. The aim of this work was to describe and analyse the coffee agroforestry system with focus on banana production. This was based on the assumption that bananas have to face deep-shaded conditions, and that coffee, banana, and trees may influence each other.

There was a high variation of field size, transmitted light, density, basal area, and canopy area. In Costa Rica mean plant density is 4244 coffee ha^{-1}, 341 trees ha^{-1}, and 579 bananas ha^{-1}. In Nicaragua mean plant density is 4852 coffee plants ha^{-1}, 185 trees ha^{-1}, and 358 bananas ha^{-1}.

Thirteen different banana cultivars were identified, of which 91 % are from subgroup AAA Gros Michel and AAA Cavendish in Costa Rica, and 97 % are from AAA Gros Michel and AAA Red Subgroup in Nicaragua. Leaf Area Index of AAA Gros Michel 'Coco' (dwarf cultivar), and AAA Red Subgroup cultivars was significantly higher than AAA Cavendish 'Congo'. Dry weight of AAA Red Subgroup was significantly higher than AAA Gros Michel 'Coco'. Number of hands of AAA Red Subgroup was significantly lower than AAA Gros Michel or AAA Cavendish. There were also significantly different infection rates of Black Sigatoka (*Mycosphaerella fijiensis*) between cultivars.

Tree canopy area and tree crown surface are significantly negative linear, correlated to percent intercepted light of banana, plant or stem density. This probably indicates that the upper tree storey influences the banana crop. Intercepted light of banana is significantly positive linear correlated to dry matter of banana. This probably indicates that light is a limiting factor.

The interrelationships between coffee, banana and tree need further verification. Further research may focus on limiting factors of banana production in coffee agroforestry systems

Keywords: Dry weight, leaf area index, light interception, banana

Contact Address: Christian Dold, University of Bonn, Institute for Crop Science and Resource Conservation, Gottfried-Kinkel-Str. 6, 53123 Bonn, Germany, e-mail: neophyta960@gmail.com