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## ***Musa* in Shaded Perennial Crops - Response to Light Interception**

CHRISTIAN DOLD<sup>1</sup>, CHARLES STAVER<sup>2</sup>, LUIS POCASANGRE<sup>3</sup>, JOACHIM HELLER<sup>4</sup>

<sup>1</sup>University of Bonn, Germany

<sup>2</sup>CGIAR, Bioversity International, France

<sup>3</sup>International Network for the Improvement of Banana and Plantain (INIBAP), Costa Rica

<sup>4</sup>University of Applied Sciences Wiesbaden, Faculty of Geisenheim, Germany

### **Abstract**

Research to improve the productivity of bananas and plantains (*Musa*) has emphasised monocropping. Millions of small farm households produce this crop associated with perennial crops and trees for consumption and market, but encounter few technologies targeted to their production constraints. Occasional research on the effect of shade on banana productivity has shown that shade reduction up to 20% has few negative impacts. Shade may reduce wind damage and leaf disease pressure, offset water and nutrient stress and contribute to a more diverse soil food web. Greater light reduction extends the crop cycle and may reduce bunch size, especially under increased plant densities.

A recent project at CATIE in Costa Rica, supported by Bioversity International, dealt with plant growth and disease pressure on banana in different shade conditions, as well as the improvement of light in agroforestry systems in relation to banana production. Disease development of Black Sigatoka on *Musa* 'Gros Michel' was significantly delayed in shade with fewer infected leaves. However, leaf emergence rate was significantly faster in higher radiation.

Light measurements with hemispherical camera in six coffee agroforestry systems with *Erythrina poeppigiana* (Poró), *Terminalia amazonia* (Roble Coral), and *Abarema idiopoda* (Cashá) did not show differences in radiation due to the plant species, but in canopy pruning and plant density. An upper storey less than 100 trees ha<sup>-1</sup> can be recommended for the improvement of banana in shaded conditions.

Further research should focus on the practical improvement of banana in shade. Leaf area index of the upper storey and photosynthetic active radiation (PAR) could be possible indicators for plant densities in agroforestry systems.

Screening of light sensitivity of different cultivar groups of bananas and plantains and within cultivar variability should be done to determine if certain cultivars are more adapted to partial shade conditions. Furthermore, the local farmers' knowledge of banana production in agroforestry systems is not yet adequately exploited.

**Keywords:** Agroforestry, light interception, *Musa*, radiation, shade