4th World Congress on Agroforestry

20-22 May 2019
Montpellier, France

Book of Abstracts

Under the High Patronage of
Mr Emmanuel MACRON
President of the French Republic

4th World Congress on Agroforestry

20-22 May 2019
Le Corum - Montpellier, France

cirad INRA SCIENCE & IMPACT World Agroforestry AGROPOLIS INTERNATIONAL MUSE MONTPELLIER UNIVERSITY OF EXCELLENCE

Suggested citation: Dupraz, C., Gosme, M., Lawson, G. (Editors). 2019.
Book of Abstracts, 4th World Congress on Agroforestry.
Agroforestry: strengthening links between science, society and policy.
Montpellier: CIRAD, INRA, World Agroforestry. 933 pages.

Compiled by Alpha Visa Congrès

Edited by Christian Dupraz, Marie Gosme and Gerry Lawson with
the members of the Scientific Committee of the Congress.

Design and layout by Alpha Visa Congrès

L22.P.05

The role of functional leaf traits in pathogenic transmission in agroforestry systems

Gagliardi S.[1] (stephanie.gagliardi@mail.utoronto.ca), Isaac M. E.[1], Avelino J.[2]

[1] *Physical and Environmental Sciences, University of Toronto Scarborough, Scarborough, Ontario, Canada*; [2] *CIRAD, Turrialba, Cartago, Costa Rica*

Variation of plant functional traits may predict ecosystem function[1], yet there is little work linking functional traits of crops and service trees, their interactions, and processes in agroforestry systems[2], specifically the transmission of pathogens. Focusing on coffee as a model, we explore how multi-species functional traits adjust abiotic processes that affect the dispersal and persistence of coffee leaf rust (CLR)[3]. We hypothesize that shade tree canopy and leaf traits will mediate CLR transmission via abiotic modifications and that key coffee functional leaf traits will suppress CLR under different agroforestry systems. This study was conducted in CATIE's coffee agroforestry research trial in Costa Rica. Throughfall kinetic energy under diverse shade tree canopies was modified by shade tree composition, canopy characteristics (e.g. crown base height; CBH) and functional leaf traits (e.g. specific leaf area; SLA). Certain shade tree traits such as canopy depth, CBH and SLA also related to trends in plant-level CLR incidence (Figure 1). CLR tended to favour certain coffee leaf functional traits, where coffee plants with low mean leaf nitrogen concentration and high mean SLA had higher plant-level CLR incidence. These results suggest that managing the functional leaf trait variation of shade trees and targeting key coffee functional leaf traits can change the persistence of CLR, thus improving our understanding of alternative resistance measures available in agroforestry.

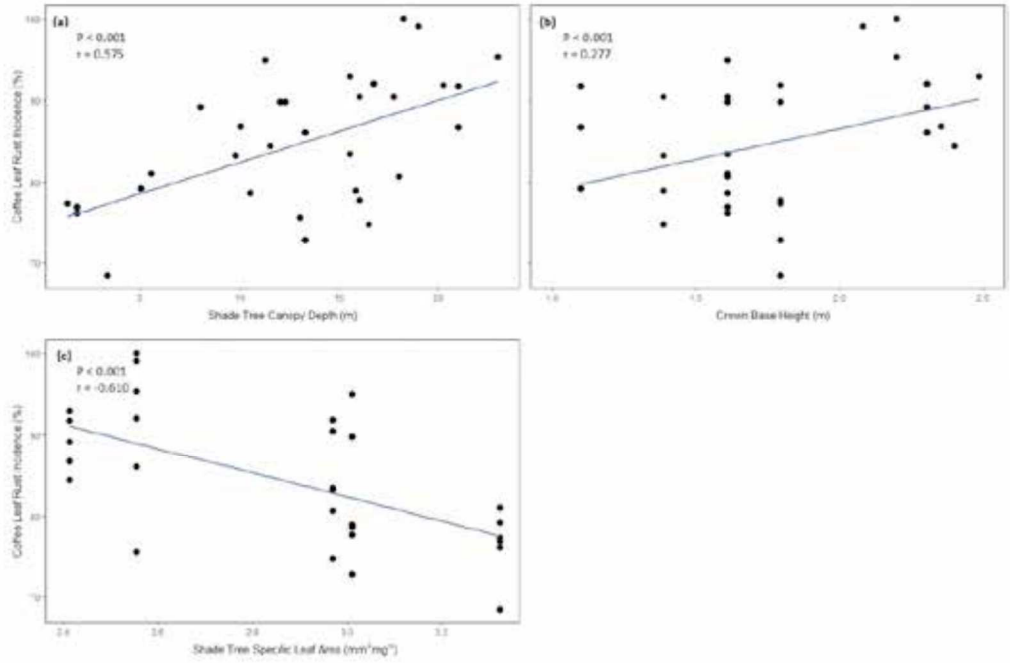

Figure 1. Bivariate relationships between mean plant-level CLR incidence and (a) shade tree canopy depth, (b) log-transformed crown base height, and (c) log-transformed mean shade tree specific leaf area in coffee agroforestry systems.

Keywords: Coffea arabica, coffee leaf rust, Hemileia vastatrix, throughfall kinetic energy, fungal plant disease.

References:

1. Díaz et al., 2016, Nature, 167–171, doi.org/10.1038/nature16489
2. Garnier et al., 2012, Agron. Sustain. Dev., 365–399, doi.org/10.1007/s13593-011-0036-y
3. Boudrot et al., 2016, Phytopathology, 572–580, doi.org/10.1094/PHYTO-02-15-0058-R