4th World Congress on Agroforestry

20-22 May 2019
Montpellier, France

Book of Abstracts

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- MIHĂILĂ Elena - Voluntari, Romania: Shelterbelts for crop protection as the main type of agro-forestry system in Romania
- BA Ousseynou - Dakar, Senegal: Valorisation of salty soils by using phosphogypsum and peanut shell on growth of 3 forest trees under salt conditions
- SAKAI Yuji - Hachioji-shi, Japan: Afforestation and agricultural production through salt-affected soil amelioration with coal bio-briquette ash in China

11:00 AM **Room Joffre A (level 1)**

L12.1 - Economics of agroforestry: the link between nature and society

Chairs: Michael Jacobson & Nathalie Cialdella

Regular talks

- FAYE MANE Ndeye Fatou - Dakar, Senegal: Planting trees to increase food security? The case study of the groundnut basin of Senegal
- MAKOVSKIS Kristaps - Salaspis, Latvia: Different tree specie and management system economics as buffer zones in Baltic climate conditions
- SMITH Joanne - Newbury, United Kingdom: Making hedgerows pay their way: the economics of harvesting hedges for bioenergy
- PADOVAN Maria Penha - Vitoria, Brazil: Dealing with financial constraints in a complex agro-forestry system in the Brazilian rainforest
- PARROT Laurent - Montpellier, France: The Alliance Approach to Innovation in agro-forestry: Agro-ecological innovations, Alliance, and Agency

11:00 AM **Room Joffre B (level 1)**

L18 - Cereals and annual crops in agroforestry

Chairs: Shibu Jose, Delphine Mézière & Andrea Vityi

Regular talks

- FALL Dioumacor - Bambey, Senegal: Importance and trees management of Senegalia senegal on soil fertility and yield of associated crops in northern Senegal
- PONTES Laíse - Ponta Grossa, Brazil: Corn yield in different integrated crop-livestock systems: the effect of shade
- BÉRAL Camille - Anduze, France: Agroforestry impacts tomatoes production in a vegetable organic alley cropping temperate system
- HODGE Kim - Regina, Canada: Measuring impact of shelterbelts on canola yield in the Canadian Prairies
- TEMANI Fida - Montpellier, France: Effect of water gradient on the intensity of competition and productivity of annual crops intercropped with olive trees

11:00 AM **Room Joffre C (level 1)**

L22 - Agroforestry: pests, diseases and weeds

Chairs: Jacques Avelino & Rolando Cerda

Regular talks

- CERDA Rolando - Turrialba, Costa Rica: Coffee agroforestry systems that reduce crop losses due to pests and diseases, while providing ecosystem services
- AVELINO Jacques - Turrialba, Costa Rica: Shade effects on coffee rust (Hemileia vastatrix)
- SCHNEIDER Monika - Frick, Switzerland: Do cacao agroforestry systems increase pest and disease incidence? Evidences from a long-term system comparison trial
- ALWORA Getrude - Ruiru, Kenya: Shade and leaf retention: an aspect of effective Coffee Leaf Rust management
- AKOUTOU MVONDO Etienne - Yaoundé, Cameroon: Effects of complex cocoa-based agro-forests on Citrus trees dieback

L22_O.06

Coffee agroforestry systems that reduce crop losses due to pests and diseases, while providing ecosystem services

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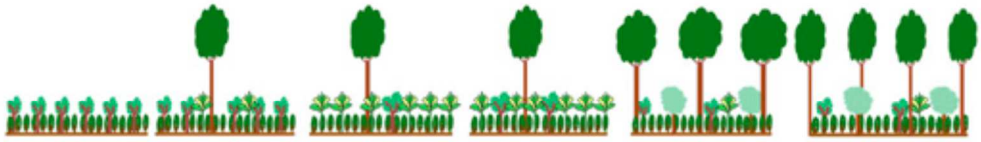
Crop losses caused by pests and diseases threaten the food security and income of thousands of families worldwide. In Latin America and the Caribbean, coffee losses have caused severe crises since 2012. Most of coffee farmers manage diverse types of coffee agroforestry systems (CAF); therefore, it is important to know: what shade canopy and management characteristics are able to reduce coffee losses due to pests and diseases, but also provide other ecosystem services such as provisioning, maintenance of soil fertility and carbon sequestration? We worked with two-year data of 61 coffee plots in Costa Rica: firstly, we estimated primary yield losses and secondary yield losses; secondly, we assessed the relationships (trade-offs) between yield losses and indicators of the other ecosystem services; finally, we identified the CAF which had the lowest losses and provided high levels of agroforestry products, soil fertility and carbon sequestration. We identified six CAF as the most promising ones for reducing losses while providing other ecosystem services. One of these systems was a simple CAF; three were medium diversified CAF; and two were highly diversified and dense CAF. For each of these CAF, we described the structure and composition of their shade canopies, management and costs, and the levels of ecosystem services they provide (see Figure). The six CAF represent different options to offer for the design of new CAF or re-design of old and/or unproductive CAF.



	CAF1	CAF2	CAF3	CAF4	CAF5	CAF6
PYL (%)	2	6	4	5	2	3
SYL (%)	11	18	4	17	18	0
Fertilizers	+++	++	++	+++	+	+
Fungicides	+++	++	+	+	+++	+
Weedings	+++	+	++	++	++	++
Costs	++	++	++	+++	++	+

CAF: coffee agroforestry system. CAF1: a simple CAF (coffee grown only under service trees); CAF2, CAF3 and CAF4: medium diversified CAF (coffee, musaceaes, service trees, fruit trees, and timber trees); CAF5 and CAF6: highly diversified and dense CAF
PYL: primary yield losses of coffee; SYL: secondary yield losses of coffee
The signs (+) indicate which CAF have more (or less) activities or costs in comparison with the others

Figure. Characteristics of the most promising coffee agroforestry systems that reduce coffee yield losses, while providing other ecosystem services (agroforestry products, soil fertility and carbon sequestration).

Keywords: Design, Yield, Shade, Soil, Carbon.